WILDLIFE REVIEW

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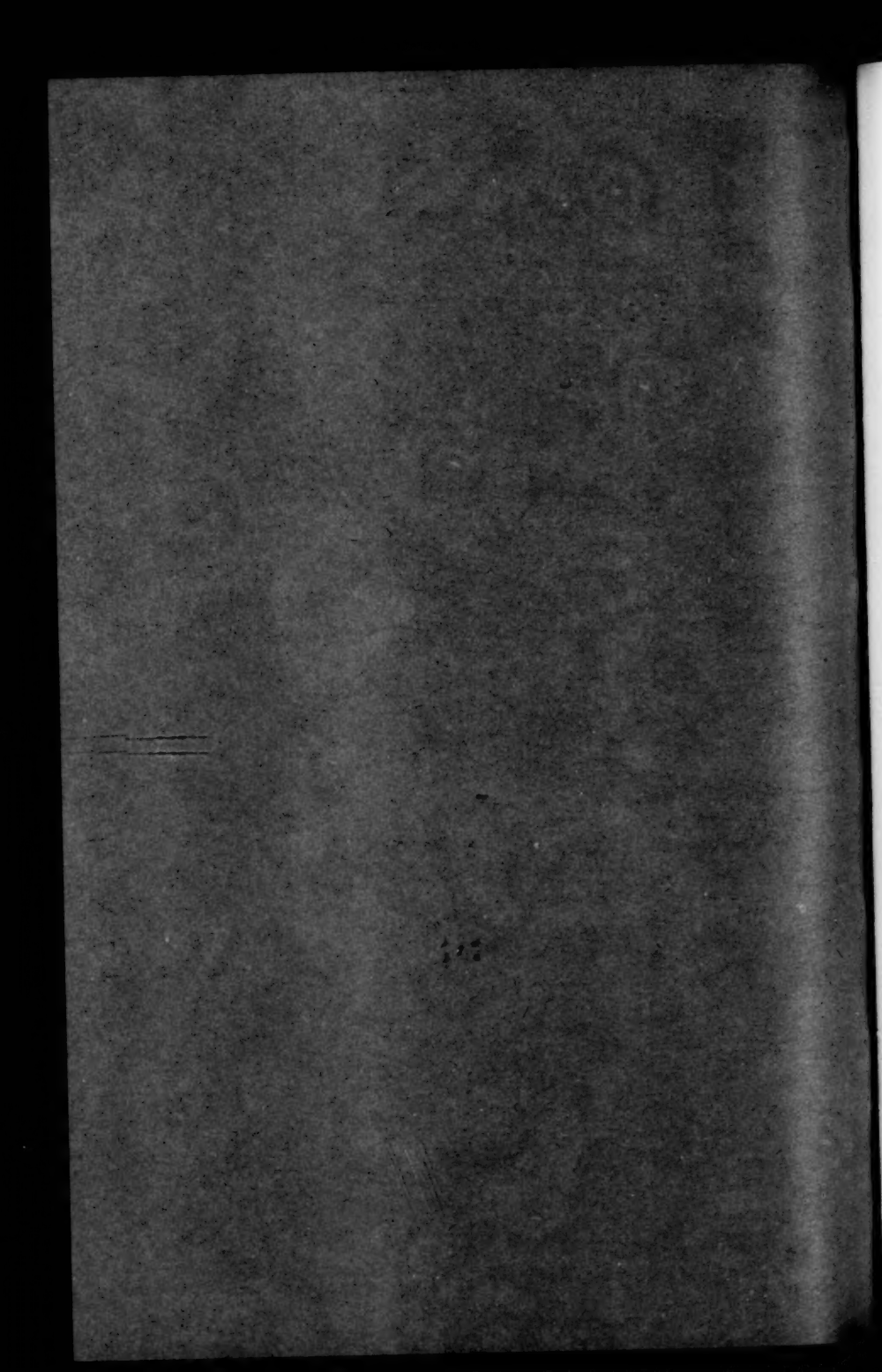

WILDLIFE REVIEW

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CONTENTS

General conservation
Natural resources & climate 2
Soils 2
Conservation education 3
Bibliographies, directories, biography, history 3
Plants
General, ecology, techniques 4
Floras, communities, taxonomy ... 5
Forest surveys 6
Wildlife
Biotas, ecology, natural history. 7
Natural areas & refuges 8
Nature protection & rare & extinct species 9
Morphology, physiology, behavior, migration 10
Effects of chemicals, weather, cars, etc. 10
Populations & fluctuations 11
Biometrics 12
Techniques 13
Management & research, general .. 14
Hunting areas & problems 15
Economic & other values 16
Food habits & techniques 16
Predation, crop damage, control . 17
Reports of organizations & reports of harvests 17
Management & ecology of habitats & animals
Wetlands & wildlife 18
Farmland & wildlife 21
Rangeland & wildlife 21
Forestland
Forestry & ecology 24
Management for & damage by wildlife 25
Stripped land & misc. habitats. 27
Control of upland vegetation with herbicides, etc. 28
Mammals
General 28
Faunas & manuals 29
Mammals
Populations, home ranges, communities 30
Parasites & diseases 31
Shrews, moles, bats 32
Rabbits & pikas 33
Rodents
Miscellaneous 35
Rattus & Mus 37
Sciurids 38
Beaver 39
Muskrat & nutria 40
Fur animals, general 41
Carnivores
Bears 42
Raccoon, ringtail, coati 42
Mustelids 42
Dogs, wolves, foxes 43
Cats 44
Big game
General 44
Deer (Odocoileus) 46
Marine 49
Other groups 51
Birds
General 51
Morphology, physiology, behavior, migration 52
Manuals, faunas, communities .. 55
Populations & fluctuations 57
Control, mortality 59
Parasites & diseases 59
Quail 60
Pheasants 64
Grouse, partridge, etc. 65
Turkey 67
Doves & pigeons 68
Waterfowl 69
Cranes, rails, shorebirds 72
Other birds 73
Reptiles & amphibians 76
Fishes 80

Author index 81

Except as indicated, abstracts are by William H. Stickel, editor.

NATURAL RESOURCES & CLIMATE

Brown, Harrison, James Bonner, and John Wier. (Calif. Inst. Tech.) THE NEXT HUNDRED YEARS. Viking Press, 625 Madison Ave., N. Y. 22, N. Y. 193 p. 1957. $3.95. [From long review by Monroe Bush, Am. For. 63(9).]

Human populations are growing rapidly and important mineral resources are being exhausted. Advanced countries probably will not be able to maintain their present standard of living for 100 years, and the whole world cannot attain that standard--the resource base simply is not great enough. However, populations will stabilize at some point, and energy sources should be sufficient when nuclear and solar power are employed. We can fall back on clay and granite as mineral sources. Highly intensive and improved agriculture can feed large populations at adequate levels. The future can be bright. The necessary paths of action are reasonably clear, but whether they are followed depends on whether man has enough intelligence to learn to live with man. If not, our present civilization may disintegrate, perhaps never to reappear.

Leonard, Warren H. (Colo. State U.) WORLD POPULATION IN RELATION TO POTENTIAL FOOD SUPPLY. Sci. Monthly 85(3): 113-125, 3 figs. Sept. 1957.

A good, concise review of present food situation and population trends and what can be done to increase food production. Some conclusions are: "...it is obvious that the present accelerated upsurge of population in the world cannot be disregarded without disaster... The world population has more than quadrupled since 1650, but the average yields of food crops per unit area of land generally have been increased at a much lower rate... At the current rate of population increase of 1.5 percent per year, the limits of food production by conventional agricultural means are in sight... Some measure of population control is necessary... Mankind ultimately must live within his resources or suffer the consequences of the controls imposed by nature..."

SOILS

Albrecht, Wm. A. (U. Mo.) SOIL FERTILITY AND BIOTIC GEOGRAPHY. Geog. Rev. 47(1): 86-105, 13 figs. Jan. 1957.

A long, significant article on the relationship of rainfall to soil fertility and the results on plants, animals, and man's affairs. Among many other things, it shows that areas of rather light precipitation, particularly the Great Plains, have the most favorable soil conditions for production of high-protein foods. Wetter areas, including e. U. S., may have high yields of carbohydrates but they are unfavorable for protein production. Seed crops and animal yields reflect these facts. Densities of animals are relatively low in the low-protein regions. Animals of these regions may have full stomachs and undernourished bodies. Mineral and other nutrition tends to be directly correlated with protein nutrition. Albrecht comments briefly on the association of wildlife with soil fertility and states, "Unfortunately, the mountain sheep and goats are being pushed away from the moderately developed mountain-valley soils that once supported them up into the rocky highlands where there is too little soil. Increased disease is the result, and the extinction of these species must be expected soon." This prediction may be overly pessimistic, but the paper as a whole contains a great deal of information that deserves serious consideration by all conservationists. And it provides much background on the weather-soil-plant-animal relationship that all wildlife men should have and few do have.

Stefferud, Alfred, editor. SOIL / THE 1957 YEARBOOK OF AGRICULTURE. US Dept. Agr. xiii + 784 p., illus. 1957. $2.25 from Supt. Documents.

Emphasis is on management of soils. The first 9 chapters discuss the nature of soils and the chemical and physical relationships of soils. Fertility is treated in 14 chapters on nutrient elements, soil organisms, and toxic elements. Twelve chapters cover fertilization, liming, and cover crops. Handling of such problems as alkaline soils, erosion, and soilborne plant diseases occupies 8 chapters. Four chapters are on irrigation, drainage, and conserving moisture. Cropping systems, soil surveys, and economics of soil management receive 8 chapters. Soils and soil management in different regions of the U. S. are discussed in 17 chapters. The last section, of 16 chapters, tells of problems and methods of handling soils for many special purposes such as ranges, legumes, field crops, gardens, forests, and windbreaks. The book is written by experts

and obviously contains an enormous amount of good information and perspective. It is, however, technical, miscellaneous, and general--neither a clear account of principles nor a handbook of specific practices that can be applied to a given field. It will serve best for one who has good background but wants up-to-date general information on a variety of subjects.

CONSERVATION EDUCATION

Carlson, Floyd Everett. (State U. Coll. For., Syracuse U.) ADULT EDUCATION --A GREAT POTENTIAL FOR TEACHING CONSERVATION. N. Y. State Cons. 12(1): 18-20, 2 photos. Aug.-Sept. 1957.

Adult education in N. Y. State has been increasing 12% a year, but conservation has seldom entered the program. In the Fall of 1956, the author organized a short course in conservation. The course was well advertised and as a result there was an av. of 82 persons per session. Each session was on a given subject, such as soils, forestry, or wildlife. Thirteen experts from 7 agencies participated. Each session consisted of two 50-minute periods. First period gave broad orientation to the subject. In second period, "The speaker would get down to brass tacks and show what his agency was accomplishing in water, forest, wildlife, or whatever subject was under discussion." Projectors, tape recorders, printed material and other aids were used freely. Apparently adult education in conservation is practicable and a genuine opportunity. Other school systems in N. Y. are planning such courses.

BIBLIOGRAPHIES, DIRECTORIES, BIOGRAPHY, HISTORY

Anon. PUBLICATIONS BY THE STAFF, PATUXENT RESEARCH REFUGE, LAUREL, MARYLAND, 1954-1956. 1-13 p., proc. [1957.]

Lists 90 publications. List is arranged by subjects.

Belt, Charles Banks. HISTORY OF THE COMMITTEE ON CONSERVATION OF FORESTS AND WILDLIFE OF THE CAMP FIRE CLUB OF AMERICA, 1909-1956. Camp Fire Club of Am., 19 Rector St., N. Y. 6, N. Y. ii + 76 p. 1956. [From long review by J. J. Hickey, J. Wildl. Mgt 21(3).]

The club has had an important impact on N. Y. and national conservation matters. Through it, in part, worked such men as Hornaday, Houghton, Albright, Greeley, Burnham, Pearson, and Frederick. On the national level, the club was influential in creation and defense of national parks and forests, and in preserving fur seals, bison, elk, antelope, Key deer, Dall sheep, and waterfowl. "The conservation movement is often full of defeat and disappointment to the individual. Mr. Belt's report should do much to dissipate such an idea: in 47 years, a small group of men, working together, can make posterity their debtors; and this one did!"

Brandborg, Stewart M., and James S. Pacy, compilers. THE CONSERVATION DIRECTORY / A LISTING OF ORGANIZATIONS AND OFFICIALS CONCERNED WITH THE PROTECTION OF WILDLIFE AND OTHER NATURAL RESOURCES. Natl. Wildl. Fed., 232 Carroll St. NW, Wash. 12, D. C. vii + 102 p. July 1957. 50¢.

An annually revised booklet that we find extremely useful. It lists addresses and leading officials of state and federal conservation agencies, and national and international conservation societies and commissions. It also gives comparable information for conservation groups and agencies in Canada and its provinces and in Latin Am. countries and the Philippines.

Craine, Lyle Eggleston. THE MUSKINGUM WATERSHED CONSERVANCY DISTRICT: AN APPRAISAL OF A WATERSHED MANAGEMENT AGENCY. Ph.D. thesis, U. Mich. 345 p. 1956. [From long abstract in Dissertation Abstracts 17(6).]

History, problems, weaknesses, needs. Major needs and problems of a local watershed agency are to maintain leadership of the program and to provide financing from local sources. Without these, the program becomes lopsided and dependence on the federal government becomes too great.

BIBLIOGRAPHY, DIRECTORIES, BIOGRAPHY, HISTORY--Continued

Huth, Hans. NATURE AND THE AMERICAN / THREE CENTURIES OF CHANGING ATTITUDES. U. Calif. Press. xvii + 250 p., 64 pl., 29 figs., col. frontispiece. 1957. $7.50.

Huth traces the development of our present concept of nature from Colonial times, when the axe was symbolic of the American attitude toward nature. Few men in early America had the vision to see the necessity of using natural resources wisely, and these men had little influence on the thinking of an expanding population. The account describes the influence of artists, poets and naturalists in stimulating interest in nature as something other than a force to be tamed. Considerable attention is given to the development of National Park policy and the Forest Service. The last forward step outlined is the recognition of aesthetic values in the management of resources and the occasional serious competition of this factor with industrial development. Primarily an historical account, this serious, well-documented volume will justify its place in conservation literature. It will repay the reader with an increased appreciation of the many and diverse influences brought to bear on a conservation concept.--Fred H. Dale.

Stickel, Lucille F., compiler. WILDLIFE ABSTRACTS, 1952-55. US F&WS. xxii + 321 p. 1957. $2.00, paper, from Supt. Documents.

All titles that appeared in Wildlife Review numbers 67-83 are cited under a subject arrangement. Author index, subject index, and table of contents are provided. A long introductory section lists publication sources and abbreviations. General plan is that of Wildlife Abstracts, 1935-51. Chief differences are that titles are not annotated, each title is given an entry number to facilitate use of indexes, and subject index is much more detailed because it is based on the full original abstracts that appeared in Wildlife Review. The volume thus serves as an index to WR numbers 67-83. It should also be of value to those who do not have or do not wish to keep all these issues of WR.

Stratton, G. Burder, editor. THE ZOOLOGICAL RECORD, VOLUME THE NINETY-FIRST, BEING THE RECORDS OF ZOOLOGICAL LITERATURE RELATING CHIEFLY TO THE YEAR 1954. Zool. Soc. London. 1957. $18.40.

This is probably the most useful bibliographic series in zoology. Wildlife workers can find a great deal of value in it, especially in the sections on birds and mammals. Each section is separately paged, cross-indexed, and may be purchased separately.

PLANTS--GENERAL, ECOLOGY, TECHNIQUES

Becking, Rudy W. (Pa. State U., U. Park.) THE ZÜRICH-MONTPELLIER SCHOOL OF PHYTOSOCIOLOGY. Bot. Rev. 23(7): 411-488, 4 figs. July 1957.

The author, a Dutch forester trained in the ZM school, presents a detailed review of this system. He compares it with other systems of plant classification and discusses criticisms that have been made of the ZM system. "An effective system of classification is offered by the ZM-approach, the most widely applied and most international of all the phytosociological schools in the study of vegetation. The approach has been successful in treating European vegetation which is quite comparable with that of most of the United States; further consideration and application of it on the American continent are desirable." Twelve pages of references are cited.

Humphrey, R. R. (U. Ariz.) HISTORY OF VEGETATIONAL CHANGES IN ARIZONA. Ariz. Cattlelog 11(11): 25-32. July 1956. [From J. Range Mgt. 10(4).]

Watts, May T. READING THE LANDSCAPE. Macmillan, N. Y. 230 p., illus. 1957. $4.75. [From review by Isabel F. Ahlgren, J. For. 55(9).]

A popular, nontechnical introduction to ecology for laymen. It is intended to help people understand what they see in nature. "...the author chooses 13 locations and proceeds in a leisurely, narrative style to point out what can be observed, reasoned, and surmised from evidence presented by nature. She has selected some spectacular sites, as in the fascinating description of the Indiana dunes, or the vivid picture of tiny tundra plants. She has also, however, discussed everyday habitats--a fence row, a yard and garden, a pasture.

The book is not intended to give a complete picture of ecology, but rather an introduction via habitats the author found especially interesting. Throughout the book, human ecological patterns are interwoven with those of plant and animal life... By simplification, theories may be presented dogmatically, and readers may find the exceptions confusing when they begin to observe independently... Some obsolete plant names appear..." The book can "be a useful reference for methods of presenting scientific ideas to lay groups."

PLANTS--FLORAS, COMMUNITIES, TAXONOMY

Bailey, Virginia Long. (Wayne U., Detroit, Mich.) A GUIDE TO THE FLOWERING PLANTS AND FERNS OF THE WESTERN NATIONAL PARKS. PART 2.--ANGIOSPERMS. MONOCOTYLEDONS (HYDROCHARITACEAE TO GRAMINEAE). Am. Midl. Nat. 58(1): 73-114. July 1957.

Part 1, on ferns and gymnosperms, appeared in Am. Midl. Nat. 54: 1-32, 1955, and was noted in WR 83: 60. The present part treats most of the important marsh and aquatic plants and also the grasses. It consists of technical keys to all groups. Brief indications are given of habitat or distribution, and of occurrence in the various parks. This compact series should be of real value to botanically trained visitors to the western parks.

Beatley, Janice C. (Ohio State U., Columbus.) THE WINTER-GREEN HERBACEOUS FLOWERING PLANTS OF OHIO. Ohio J. Sci. 56(6): 349-377. 1956. [From Biol. Abs. 31(11).]

"(1) A taxonomic list of 287 spp. of herbaceous flowering plants, which have green leaves throughout the winter in Ohio, and a discussion of their vegetative form and time of appearance of the winter leaves; (2) an ecological classification of the wintergreen flora and a general discussion of its ecology; and (3) a key to about 200 of the spp., based upon winter field characters."--Author.

Breitung, August J. (Calif. Inst. Tech., Pasadena.) PLANTS OF WATERTON LAKES NATIONAL PARK, ALBERTA. Can. Field-Nat. 71(2): 39-71. Apr.-June 1957.

Gives brief description of area and annotated list of all ferns and seed plants.

Breitung, August J. (Calif. Inst. Tech.; Pasadena.) ANNOTATED CATALOG OF THE VASCULAR FLORA OF SASKATCHEWAN. Am. Midl. Nat. 58(1): 1-72. July 1957.

This list of 1380 taxa is based on more than 20 years of work. Entry for a taxon consists of scientific and common name and brief statement of habitats and distribution in Sask. Taxa excluded from the list are treated at the end.

Brown, Clair A. CHECK LIST OF WOODY PLANTS OF LOUISIANA, NATIVE, NATURALIZED, AND CULTIVATED. La. For. Comm., Baton Rouge, Bul. 8. 16 p. 1957. [From Monthly Checklist of State Publ. 48(10).]

Davidson, Robert Austin. (State U. Iowa, Iowa City.) THE FLORA OF SOUTHEASTERN IOWA. Ph.D. thesis, State U. Iowa. 763 p. 1957. [From abstract in Dissertation Abstracts 17(6).]

Apparently a long and thorough study of taxonomy and distribution. Includes maps for each species.

Gilman, Elizabeth M. GRASSES OF THE TIDEWATER-PIEDMONT REGION OF NORTHERN VIRGINIA AND MARYLAND. Castanea 22(1): 1-105, 1 map, 1 p. of figs. Mar. 1957. 75¢ from Elizabeth Bartholomew, W. Va. U., Morgantown.

Keys and diagnoses for all groups down to species. Statements of habitat and distribution in area. Should prove to be useful, up-to-date manual for the area around Washington and Baltimore (from Chesapeake Bay w. to Blue Ridge, from Pa. line s. to the Rappahannock and Rapidan rivers in Va.).

PLANTS--FLORAS, COMMUNITIES, TAXONOMY--Continued

Hoy, Wm. E., editor. (U. of S. C.) AN ECOLOGICAL STUDY OF THE FAUNA AND FLORA OF THE SAVANNAH RIVER PLANT AREA [Continued]. U. of S. C. Publ., Ser. 3, Biol., 2(2): 45-89. June 1957. Entire issue, p. 45-117, $1.00.

Several papers of this series were cited in WR 86. Papers in the issue cited above include: The dicotyledons (Gentianaceae through Lobeliaceae), by W. R. Kelley and W. T. Batson. This is a list with notes on habitat and season of blooming. The 3 papers below give brief descriptions of the areas and tabulations of quadrat data. The vegetation of a mature beech-magnolia forest within the Gantt Tract, by W. T. Batson, W. R. Kelley, L. F. Swails, Jr., and F. F. Welbourne, Jr. The flora of the bottom lands of the Savannah River swamp, by L. F. Swails, Jr., F. F. Welbourne, Jr., and Wm. E. Hoy. A mature pine stand in the Congaree bottom land, by L. F. Swails, Jr., Wm. D. Anderson, Jr., and W. T. Batson.

Ritchie, J. C. (U. Manitoba, Winnipeg.) THE VEGETATION OF NORTHERN MANITOBA. II. A PRISERE ON THE HUDSON BAY LOWLANDS. Ecology 38(3): 429-435, 4 figs. July 1957.

Summary: "On certain glacio-fluvial substrata...there is evidence of a distinct sequence of vegetation. This sequence, not universal in this geographical region, might be summarized as follows: MEADOW PHASE (on freshly exposed flats)⟶ SHRUB PHASE⟶ INVADING FOREST (Picea glauca and Larix laricina)⟶ CLOSED FOREST (Picea glauca)⟶ BLACK SPRUCE OPEN FOREST (with mound-hollow topography)."

Taylor, T. M. C. (U. of B. C.) THE FERNS AND FERN-ALLIES OF BRITISH COLUMBIA. B. C. Prov. Mus. (Victoria) Handbook no. 12. 1-154 p., illus. June 1956. 50¢.

Good manual. Has keys to all taxa down to species, descriptions, drawings of all or most species and their diagnostic features, and brief statements on habitat, range, and other points. The book is a bit on the technical side, but almost anyone should be able to use it with aid of the glossary, drawings, and keys.

Tisdale, E. W., and A. McLean. (U. Idaho, Moscow.) THE DOUGLAS-FIR ZONE OF SOUTHERN INTERIOR BRITISH COLUMBIA. Ecol. Monog. 27(3): 247-266, 11 figs. July 1957.

Plant communities, successions, and factors that influence them.

Vannersdall, Harry E. FERNS OF OHIO. Curtis Book Store, Wilmington, Ohio. 300 p., illus. 1956. $3.09. [From review by E. T. Wherry, Nat. Mag. 50(8).]

"This attractive book begins with brief essays on ferns as a hobby, the life history of ferns, Nature photography, conservation, the importance of Nature study in schools, and picturesque places in Ohio. Then follows an alphabetical listing of the species known in the State, with descriptions, distributional data, accounts of the writer's experiences in searching for rarities, and suggestions as to identification. For each species there are reproduced three large photographs, showing habitat, frond-outline, and details of spore-bearing structures. The charmingly written text is in refreshing contrast to the recently published crude and inaccurate 'Field Guide to Ferns.'"

PLANTS--FOREST SURVEYS

Minnesota. THE FOREST RESOURCE OF SOUTHEASTERN MINNESOTA. Office of Iron Range Resources & Rehabilitation, 624 State Office Bldg., St. Paul 1, Minn. 1-60 p., 9 figs. 1957.

Areas, ownership, timber types and volumes, cutting, industries, growth, allowable cut, recommendations for better management. Most of the forest is oak and grows on private farmland on sites unfavorable to agriculture. About 61% of forest has sawtimber stands. Some tree species are in good supply, others are being overused. Future cutting should encourage the scarcer or more valuable timber species and should be designed to upgrade stands and protect sites from erosion. Planting is desirable on some areas.

Minnesota. THE FOREST RESOURCE OF SOUTHWESTERN MINNESOTA. Office of Iron Range Resources and Rehabilitation, 624 State Office Bldg., St. Paul 1, Minn. 1-47 p., 9 figs. 1957.

Covers a huge triangular area that lies s. and w. of a line through Grant, Meeker, and Dodge counties. Most of the area was originally prairie but is now mainly farmland with only 3% of the land in forest, much of which is on bottomlands. The report gives data on amount of forest in each county, forest types, timber volumes, cutting, utilization, growth, and allowable cut.

WILDLIFE--BIOTAS, ECOLOGY, NATURAL HISTORY

Blair, W. F., A. P. Blair, Pierce Brodkorb, F. R. Cagle, and G. A. Moore. VERTEBRATES OF THE UNITED STATES. McGraw-Hill Book Co., N. Y. ix + 819 p., 426 figs. 1957. $12.00.

Technical manual with keys and diagnoses for all groups down to and including species. It is intended for college class use. For that or any other use it is vastly better than Pratt's manual ever was. Classes and orders are defined technically, with explanations of anatomical characters, classification, geological range, etc. Keys, however, use familiar external and osteological characters insofar as feasible. Species accounts give scientific and common name, brief description, and range. Subspecies are not mentioned. The authors are well-known experts and the book is good in many ways. The fish section is especially valuable, for no comparable, modern treatment exists. The book does not cover marine fishes or reptiles, but it does cover marine birds and mammals. The critical question about a book of this sort is: How well do the keys work? They often require fresh, adult, typical specimens (sometimes of a given sex) that may be dissected. The reviewer tried keying down several species (no fishes) and he inspected other keys. A little more than half the species he tried keyed down reasonably well. Some could not be keyed down; others could be keyed only with special knowledge not provided by the few illustrations and glossary. Equally weak or difficult places were noted in certain other keys. Much of this trouble stems from natural variability within groups and similarities between groups. But it seems unnecessary for Bryant's fox squirrel to key only to Ariz. gray squirrel and for the cricket frog to go wrong in the key to suborders unless one has very special knowledge. The keys should be greatly changed after a few years of class use. They now require the presence of an exceptionally well-informed instructor to set the user right. This volume by no means obviates the need for the better specialized handbooks and checklists. Certainly it should not be used by nonspecialists for serious identification work; field guides have been misused for this purpose and we fear that the present volume will be too. This is a good book, a real advance, but its use should be restricted to the classroom.

Dansereau, Pierre. BIOGEOGRAPHY: AN ECOLOGICAL PERSPECTIVE. Ronald Press, N. Y. 394 p. 1957. $7.50. [Review by J. R. Vallentyne, Am. Sci. 45(4).]

"Drawing freely on his wide experience, the author attempts to integrate the ecological aspects of biogeography into a definitional whole. The result is a well-ordered treatment, supported by varied and accurate examples, and abundantly illustrated. The detail most thoroughly covers the distribution and ecology of terrestrial plants, although animals and aquatic plants are more than passingly referred to. The five chapters concern the history of biota, bioclimatology, synecology, autecology, and the nature and effects of human land use. An appendix, a glossary, and a bibliography of recent and classic works enhance the value of the text. Because of the classificatory nature of the book, some may find the complex terminology excessive, and in places used to the detriment of explanation. In terms of integrative value (the sole basis on which the book can be judged), the author has achieved no small measure of success."

Larrison, Earl J. (U. Idaho.) OWYHEE: THE LIFE OF A NORTHERN DESERT. Caxton Printers, Caldwell, Idaho. 357 p., illus. 1957. $5.00. [From reviews by M. L. Johnson, Murrelet 38(2), and Amy Clampitt, Aud. Mag. 59(5).]

Readable narrative account based on 5 years of field work in this desert of sw. Idaho. Each of the 26 chapters gives a picture of some facet of desert life. "There is a wealth of factual information about the history, geology, ecology, relationships of the range management and the desert, relationship of the natural inhabitants and weather, and ability of desert animals to survive. What appears to be a complete index makes this a reference book in fact. The serious worker in mammalogy or ornithology will find many observations of interest recorded. Interspersed in each chapter one gets the picture of modern field methods, and theories of adaptation, evolution, and many other subjects. Many will enjoy the comparison of Owyhee with other deserts of the world." The author "begins with the wildlife, but by no means leaves off there: old newspaper items, the gory doings inside a range corral, a discussion of overgrazing, even camp menus and the remarks of a stray female tourist, along with a vast amount of geological, meteorological, herpetological, and other data, find their way into Mr. Larrison's account of just what Owyhee is like." Many black and white drawings and colored frontispiece.

Thorsteinsson, R., and E. T. Tozer. (Geol. Surv. Can., Ottawa.) GEOLOGICAL INVESTIGATIONS IN ELLESMERE AND AXEL HEIBERG ISLANDS, 1956. Arctic 10(1): 2-31, 16 figs. 1957.

Pages 28-30 present notes on status and abundance of 9 kinds of mammals and 14 kinds of birds. 1956 was a good year for musk oxen, hares, and lemmings. Snow geese were common and successful nesters.

Yocom, Charles, and Raymond Dasmann. (Humboldt State Coll., Arcata, Calif.) THE PACIFIC COASTAL WILDLIFE REGION / ITS COMMON WILD ANIMALS AND PLANTS. Vol. 3 of Am. Wildl. Region Ser. Naturegraph Co., San Martin, Calif. 112 p., illus. 1957. $2.00, paper; also available in cloth.

Popular guide to major associations and common or representative plants and vertebrates of the high-rainfall strip along the coast from Monterey Co., Calif. to s. B. C. Its chief value will be to beginners and amateur naturalists who want a general introduction to natural history of the region. Each major habitat, such as coastal marshes, brushfields, and coniferous forests, is characterized briefly and illustrated by a photo. Typical plants of each habitat are illustrated by drawings and discussed concisely with mention of range, characteristics, and uses. Common animals of the habitat are then listed. In following sections, many kinds of mammals and birds are treated briefly, with drawings and notes on appearance and natural history. A few reptiles and amphibians are similarly treated, but more species of these groups are treated in charts that give facts on appearance, habitats, and ranges. Four important species of salmon and trout are included in the book because of popular interest in them. The book closes with a list of several good references, none of which is on fishes, and an index. Apparently the book was produced by photo-offset process; if so, it is an exceptionally good example of the process, for even the photos are sharp and clear.

WILDLIFE--NATURAL AREAS & REFUGES

Champion, Boyd. (US Soil Cons. Serv.) GREEN GRASS WHERE THE WILD GOOSE GOES. Outdoor Am. 22(5): 4-7, 4 photos. Sept.-Oct. 1957.

Ky. Woodlands Natl. Wildl. Refuge, 65,548 acres, has about 5,000 acres of grass and scrub and the rest is in timber. When purchased, the land was in bad shape from burning, mining, hard farming, and erosion. The SCS prepared plans for building up the arable land and the F&WS carried them out. Lime, phosphate, and potash were applied. Brush was removed, gullies were filled, terraces and waterways were constructed. Grasses and legumes were planted. Total cost was $45. per acre. Part of the land is share-cropped, part farmed just for waterfowl. Milo and corn are chief seed crops grown for waterfowl. Crop yields per acre have climbed. Many forms of wildlife use the refuge. Raccoons are hunted and deer are hunted by archery, but other animals are protected or trapped for restocking. In 1956 the refuge wintered some 20,000 geese and 80,000 ducks, about 5 times as many as in 1952.

Gee, E. P. THE MANAGEMENT OF INDIA'S WILD LIFE SANCTUARIES AND NATIONAL PARKS. II. J. Bombay Nat. Hist. Soc. 52(4): 717-734, illus. 1955. [From Biol. Abs. 31(8).]

Gee, E. P. THE MANAGEMENT OF INDIA'S WILD LIFE SANCTUARIES AND NATIONAL PARKS. III. J. Bombay Nat. Hist. Soc. 54(1): 1-21. 1956. [From Biol. Abs. 31(8).]

Tilden, Freeman. (Natl. Park Serv.) INTERPRETING OUR HERITAGE. U. of N. C. Press, Chapel Hill. xviii + 110 p., 42 photos. 1957. $3.50.
Visitors in parks, other natural areas, historic buildings, and museums often are indifferent or bored. How can they be reached? How can they be given comprehension, interest, or even a feeling of uplift? Tilden's book is a carefully considered account of principles that should be followed for successful interpretation. It is not a techniques manual but a study of basic generalities. Six chapters are devoted to the cardinal principles: "I. Any interpretation that does not somehow relate what is being displayed or described to something within the personality or experience of the visitor will be sterile. II. Information, as such, is not Interpretation. Interpretation is revelation based upon information. But they are entirely different things. However, all interpretation includes information. III. Interpretation is an art, which combines many arts, whether the materials presented are scientific, historical or architectural. Any art is in some degree teachable. IV. The chief aim of interpretation is not instruction, but provocation. V. Interpretation should aim to present a whole rather than a part, and must address itself to the whole man rather than any phase. VI. Interpretation addressed to children (say, up to the age of twelve) should not be a dilution of the presentation to adults, but should follow a fundamentally different approach. To be at its best it will require a separate program." These principles are elaborated with many examples. Other chapters take up the art of writing inviting but penetrating inscriptions; how to bring the past into the present through demonstration, participation, and animation; the virtues of restraint and simplicity; the problem of handling aesthetics; how the interpreter can touch the interest of the visitor; the proper role of gadgetry; and the possibility of stimulating strong amateur interest.

WILDLIFE--NATURE PROTECTION & RARE & EXTINCT SPECIES

Appelman, F. J. REPORT ON A TOUR TO EAST AFRICA AND THE BELGIAN CONGO FROM MARCH 28 TO JUNE 14, 1955. [Also] NATURE PROTECTION. Netherlands Commission for International Nature Protection (Amsterdam), Mededelingen no. 17. 1-45 p., 1 map, 10 photos. Dec. 1956. No price stated.
The first part of this booklet reports the conservation findings of a trip through Kenya, Uganda, Tanganyika, and Belgian Congo. Much big game remains and some good reserves exist, but the game is being destroyed rapidly and reserves are being invaded and reduced. Game is still being extirpated from large areas under the dubious banner of tsetse fly control. Game is ruthlessly controlled for crop protection, even around small, poor, isolated fields. Game must take second place at all times to the huge and growing herds of natives' cattle. Poaching is extremely heavy and affects even rare forms. Deforestation, cultivation, overgrazing, and erosion are proceeding rapidly. White influence is waning and hardly an African has any idea of conservation. Reserves are being altered and threatened for various economic reasons. Game departments are small and weak. Liaison between departments concerned with conservation and development matters is very poor. The second part of the booklet discusses needs and methods of nature protection. Appelman notes the need of habitat control even in virgin reserves to maintain the desired plant and animal communities. He recognizes the value of regulated hunting for certain types of control, for recreation, and for income for conservation work. He recommends that more countries tax hunting and hunting equipment for this work; only in N. Am. and Belgian Congo does wildlife work have substantial financing. He also stresses the need for more reserves and for consideration of game in commercial forests. In closing, he discusses these problems as they pertain to Indonesia.

WILDLIFE--MORPHOLOGY, PHYSIOLOGY, BEHAVIOR, MIGRATION

Various authors. L'INSTINCT DANS LE COMPORTEMENT DES ANIMAUX ET DE L'HOMME. Masson et Cie., Paris. iv + 796 p., illus. 1956. Broché, 6,500 francs; Cartonné toile, 7,200 francs. [From long review by P. T. Haskell, Nature, Sept. 14, 1957.]

"This book consists of the papers, complete with illustrations and subsequent discussions, delivered at a symposium entitled 'Instinct in the Behaviour of Animals and Man,' which was arranged by the Singer-Polignac Foundation in June 1954. The papers and discussions are in the language of their contributors, French, German and English. The interest of this symposium is two-fold: first, the very wide range of organisms covered, and the inclusion of papers on instinctive behaviour in man, a very neglected aspect of this field; secondly, the fact that it afforded an opportunity for a further round in the important controversy between the so-called 'objectivist' school of ethologists led by Drs. K. Lorenz and N. Tinbergen, and their opponents from the ranks of the psychologists, led by Drs. T.-C. Schneirla and D. Lehrman." Haskell's review gives further information on this important volume. Authors not mentioned above are: Autuori, Bénassy, Benoit, Courrier, Deleurance, Fontane, von Frisch, Gesell, Grassé, Haldane, Mrs. Haldane-Spurway, Hediger, Klein, Koehler, Morris, Piéron, Richter, Ruyer, and Viaud.

WILDLIFE--EFFECTS OF CHEMICALS, WEATHER, CARS, ETC.

Berezina, N. A. DAMAGE TO FISH FROM THE USE OF INSECTICIDES TO CONTROL BITING INSECTS. Voprosy Ikhtiologii 7: 209-220. 1956. [From Biol. Abs. 31(9).] In Russian.

DeWitt, James B. (Patuxent Refuge, Laurel, Md.) H-BOMB IN THE GARDEN PATCH. Wildl. in N. C. 21(9): 4-6, 1 photo. Sept. 1957.

Effect of newer insecticides on survival and reproduction of birds, especially quail and pheasants. According to author (who disclaims responsibility for title of paper), material here is essentially the same as that presented by him in Atlantic Naturalist 11(3) [see WR 84: 7] and Agr. & Food Chem. 4(10) [see WR 88: 6].

Ensminger, Allan B., and Lewis G. Nichols. (La. Wildl. Comm., New Orleans.) HURRICANE DAMAGE TO ROCKEFELLER REFUGE. Presented at 11th Ann. Conf. SE. Assn. Game & Fish Comms. 10 p., mimeo. Oct. 1957.

Describes refuge, management structures on it, and damage caused by hurricane Audrey of June 27, 1957. The refuge is an 84,000-acre tract of marshland in sw. La. and is owned by state. It has 93 miles of levees for canals and impoundments. Winds of well over 100 m.p.h. put saltwater 9-12 feet deep over the refuge. Some saltwater remained for weeks. Certain stands of freshwater plants may have been destroyed. Flushing of the bottom may have helped by removing dead vegetation. All buildings were destroyed or badly injured; those 10 feet up on pilings suffered least. Some levees were broken badly. Those covered with Bermuda grass or St. Augustine grass held up best. Concrete water-control structures were not damaged but there was washing around them. In general, over half the game population was lost. Trapping for muskrat and nutria will be poor for a few years. Mortality of nutria, muskrat, raccoon, rabbit, and deer was estimated at 60%. Mink and otter survived better. All nests were swept away. Some ducks were found to make out well. 95% of dead birds were gallinules and rails. Some alligators were killed by storm, some were washed out of refuge and killed by man, but many survived. Development of refuge was set back about 2 years.

Waldo, Ednard. HURRICANE DAMAGES REFUGES. La. Cons. 9(8): 16-17, 3 photos. Sept. 1957.

General account of effect of hurricane Audrey (June 27, 1957) on birds, mammals, reptiles, and refuge property and personnel on La. coast. Waterfowl habitat was severely damaged and many nutria, deer, gallinules, other birds, and alligators were killed. Relatively few mink and otter are thought to have been killed. Few cottonmouths were killed directly; those encountered on drift were extremely irritable and vicious.

WILDLIFE--POPULATIONS & FLUCTUATIONS

Birch, L. C. (U. Sydney, Australia.) THE MEANINGS OF COMPETITION. Am. Nat. 91(856): 5-18. Jan.-Feb. 1957.

The word "competition" has been used to mean many things. These are discussed under 4 main meanings. In the strict sense, competition occurs when animals utilize a resource that is in short supply; or if a resource is not in short supply, competition occurs when animals harm one another in seeking that resource. Less properly, the word has been used almost synonymously with natural selection, or to include any form of interference between species, or to include predation. "A distinction is made between the influence of one species on the numbers of another and the influence of one genotype on the frequency of another genotype of the same species. In the former case one species can influence the frequency of another by competition only when there is a shortage of some resource. The one exception is some special cases of threat. The conclusion is drawn that if the term competition is retained in biological writings it should be restricted to the one strict meaning defined above." Perhaps the whole vague concept should be discarded in favor of more specific ones.

Mac Lulich, D. A. (342 Marshall Court, Ottawa, Can.) THE PLACE OF CHANCE IN POPULATION PROCESSES. J. Wildl. Mgt. 21(3): 293-299, 1 graph. July 1957.

The recent overemphasis on random numbers as cause or explanation of the recurrent fluctuations in animal populations is refuted. The characteristic feature of the population pattern of the varying hare is the large decrease followed by slow initial increase. When events conforming to this pattern are looked for in rectangular random numbers it is found that the av. interval of recurrence is 59 years instead of about 10 years as for the hare. Similarly, in a normal random distribution, the av. expected interval is 71 years. Random numbers do not explain wildlife population history and resemblance to random numbers in a population time series has no significance. Chance alterations to the course of populations occur in at least four ways: (a) catastrophic events, (b) coincidence of critical weather with a critical phase of the animal's existence, (c) real chance encounters are a necessary step in the life history of some animals, particularly some parasites, and (d) the genetic composition of a population may alter its proportions drastically when the numbers are at a low ebb.--Author.

Morris, R. F. (For. Biol. Lab. Fredericton, N. B.) THE INTERPRETATION OF MORTALITY DATA IN STUDIES ON POPULATION DYNAMICS. Can. Ent. 89(2): 49-69, 1 graph. Feb. 1957.

Investigators of wildlife population dynamics will find the methodology and conclusions of this paper stimulating. The paper is an excellent discussion of factors that affect mortality. It reviews published data, with special reference to life-table for spruce budworm, in 5 p. The main discussion then considers the question, "How can mortality data best be interpreted in order to explain changes in population from year to year and from place to place?" The discussion is complete and well organized. Various earlier ideas are accepted or rejected. Major conclusions are: 1. Variation is the important attribute of mortality; low but variable mortalities may therefore have more influence on population trends than high but relatively constant mortality. 2. Natural factors may cause relatively constant mortality, or mortality that varies within certain limits. Natural factors seldom disappear from the complex, and new factors seldom appear, except through man's intervention. 3. Since most mortality factors appear to be density independent, it is essential to keep in mind that variations at high levels are potentially more important. 4. Magnitude of mortality contributed by contemporaneous factors is extremely important; it serves to explain why a low but variable mortality can act as the primary determiner of population trend. We find this paper valuable, dependable, and applicable to studies of vertebrates.--Earl L. Atwood.

Svärdson, Gunnar. THE "INVASION" TYPE OF BIRD MIGRATION. Brit. Birds 50 (8): 314-343, 5 figs. Aug. 1957.

Long paper, with many references, on cause of cycles in game birds and small mammals and cyclic invasions of small birds. It is based mainly on conditions in n. Europe. The fundamental idea is that trees and perhaps other plants fruit heavily every 3-4 years. One factor in heavy fruiting is warm June in year before. Heavy fruiting 1 year is followed inevitably by poor fruiting the next

year. Production of buds and nutrients may follow a similar course. Population peaks of small mammals and game birds tend to follow winters of good food supply. Invasions of small birds occur when food supplies are unusually scant in the North so that birds leave en masse in the autumn. Data on all these topics are discussed. "It is suggested that the rhythm of fructification of some perennial plants, animal cycles and the invasion type of bird migration form one great ecological complex of mutual adaptation."

Wing, Leonard W. (3875 Vorhies Rd., Ann Arbor, Mich.) ULTRA LONG WAVES AND SOLAR TERRESTRIAL CYCLE RELATIONSHIPS. J. Cycle Res. 6(3/4): 55-119, 88 figs. July-Oct. 1957.

"Technical report using many terrestrial phenomena to test behavior of waves of 668, 198, 11.08, 9.93, 9.60, 9.27, 4.418, 4.222, 3.862, and 3.767 years and 5.115 days in many solar and terrestrial events. Reported by cycle workers to be most important paper to date in field. Several previously unreported techniques used." Author's summary for those interested in animal fluctuations: "Animals mentioned are prairie chicken, ruffed grouse, waxwing, lynx, snowshoe rabbit, Atlantic salmon, grasshoppers, pine grosbeak, lemmings, rodents. Animals behave differently towards cycles, as if they 'tuned in' on some and ignored others. Cycle amplitude in temperature is greatest in high latitudes, which long has been said for animals. Epochs of cycles appear first in high latitudes and pass latitudinally, latitudinal passage being in the ratio of $\sqrt{1/2}$ (Wave Length)^2 for 90°. The '11-year sunspot cycle' is measured as 11.08 years in sunspot and/or aurora data since 649 B.C. No rigorous tests so far have shown it to be important in animal fluctuations. For every cycle found in terrestrial phenomena, a corresponding cycle occurs in solar data, simultaneous and matching in latitude. For comparison, however, timing of terrestrial cycles must be passed latitudinally to about 20°, the average of the 'sunspot zones.' In the same way, allowance for latitudinal passage must be made in comparing terrestrial events reflecting any cycle. A probable simultaneous counter-passage phenomenon occurs, but probably has no direct bearing upon animal fluctuations. The paper chiefly concerns broad relationships, and animal data are used along with many others as examples of these relationships."

WILDLIFE--BIOMETRICS

Kendall, M. G., and W. R. Buckland. A DICTIONARY OF STATISTICAL TERMS. Oliver & Boyd Ltd., Edinburgh, Scotland. ix + 493 p. 25s. 1957.

An excellent contribution to the field of statistical analysis. The wildlife biologist who wishes to know whether or not he has used a statistical term correctly will find this book a reliable source of information. There is a glossary and index of terms in French, German, Italian and Spanish and equivalent English expressions.--V. Schultz.

Schultz, Vincent, and Mitchell A. Byrd. (U. Md.) AN ANALYSIS OF COVARIANCE OF COTTONTAIL RABBIT POPULATION DATA. J. Wildl. Mgt. 21(3): 315-319. July 1957.

An application of an analysis of covariance to the study of game populations has been presented. Where flushing lines of unequal length are utilized to study relative population densities, it appears that an analysis of covariance is a proper analytical procedure.--V. Schultz.

Schultz, Vincent, and Robert J. Muncy. (U. Md.) AN ANALYSIS OF VARIANCE APPLICABLE TO TRANSECT POPULATION DATA. J. Wildl. Mgt. 21(3): 274-278, 1 fig. July 1957.

An analysis of variance for a partially hierarchal model is applied to deer population data. The statistical results are consistent with biologically expected results.--V. Schultz.

Selleck, David M., and Chester M. Hart. (Calif. Dept. Game.) CALCULATING THE PERCENTAGE OF KILL FROM SEX AND AGE RATIOS. Calif. Fish & Game 43(4): 309-316. Oct. 1957.

Summary: "New and simplified formulas are presented for calculating percentage of kill from sex or age ratios in a population before and after a kill and in the kill. Total kill figures are not needed to calculate percentage of kill, but population numbers may be calculated by use of the formulas if the total kill is known. Application of Kelker's formulas to calculate percentage of kill from sample kill data, without knowing the total kill, is shown. Either type of formula may be used to calculate percentage of kill with ratio data, or population numbers with ratio data and total kill. However, the new formulas presented are simpler and believed to be easier to use and remember."

WILDLIFE--TECHNIQUES

Cruickshank, Allan D., editor. HUNTING WITH THE CAMERA. Harper & Bros., N. Y. 215 p., 41 photos, 1 in color. 1957. $4.50. [From review by Sam Dunton, Animal Kingdom 60(5).]

"Allan D. Cruickshank, the well-known photographer of wild life, has produced a valuable book for any photographer, amateur or professional. He has written the sections on birds and mammals...Charles E. Mohr treats of amphibians and reptiles, Edward S. Ross discusses insects, Herman W. Kitchen contributes a chapter on marine life, and Rutherford Platt handles the photography of plants. Emphasis is properly placed on the blinds, baiting, and other devices essential to wildlife photography, rather than on complicated photographic technology. Exposure data for the superb illustrations are given in a separate section, and there is a detailed index."

Hickey, J. J. (U. Wis.) EDITORIAL NOTE [BEST WAY TO EXPRESS SEX RATIOS]. J. Wildl. Mgt. 21(3): 347. July 1957.

Stating sex ratios as ♂♂ per 100 ♀♀ is considered undesirable for statistical reasons. "As honored as the traditional ratio is, its confidence limits are asymmetrical and seldom expressed. The result is an intellectual trap into which all but the most biometrically minded game managers are apt to fall... With 50 per cent of one sex in an infinite population, it is simple to recall that, as a general rule (95 times out of 100), samples of 100 will lie within 10± per cent of this 50, samples of 1,000 within ±3 per cent, and samples of 3,000 within ±1 per cent. This 10-3-1 series is easy to remember, and it has none of the awkwardness associated with similar limits attachable to males per 100 females, which for samples of 100 drawn as above would vary from 67 to 150 males per 100 females."

Kent, Fred W. (7 E. Market St., Iowa City, Iowa.) PHOTOGRAPHING WITH A BINOCULAR OR TELESCOPE. Iowa Bird Life 27(2): 34-37, 4 photos. June 1957.

Krumholz, Louis A., committee chairman. (U. Louisville.) GLOSSARY OF WILDLIFE TERMS. J. Wildl. Mgt. 21(3): 373-376. July 1957.

The Wildlife Society's committee on terminology worked for years to prepare this report. Of 600 terms suggested, the committee selected 56 commonly misunderstood ones for special definition and any necessary explanation. Many fisheries terms are included. Among the wildlife terms considered are: age group, biomass, browse line, carrying capacity, community, Kelker Index, Lincoln Index, overcrowded, population, productivity, recapture, recovery, repeat, retrap, return, and yield.

Lemmon, Paul E. (US Soil Cons. Serv., Wash. 25, D. C.) A NEW INSTRUMENT FOR MEASURING FOREST OVERSTORY DENSITY. J. For. 55(9): 667-669, 4 figs. Sept. 1957.

Spherical densiometer and its use described.

Schultz, H. B., and F. A. Brooks. (U. Calif., Davis.) A SPOT CLIMATE RECORDER. Bul. Am. Meteorol. Soc. 37(4): 160-165, illus. 1956. [From Biol. Abs. 31(9).]

"In agricultural research as well as in applied climatology as a whole, there is an increasing demand for portable meteorological field equipment capable of recording continuously more environmental factors than the conventional hygro-thermograph. The spot climate recorder described can register dry bulb, wet bulb, soil, and black globe temperatures, and wind direction and velocity on either daily or weekly charts, whichever is best for the climate survey. If desired, all these elements can be registered on one chart, but a set of 2 recorders was found no more expensive and gives the economic advantage of making each useable separately..."--Authors.

WILDLIFE--MANAGEMENT & RESEARCH, GENERAL

Borell, A. E. (Soil Cons. Serv., Denver, Colo.) A BRIGHT OUTLOOK FOR WILDLIFE. Soil Cons. 23(4): 75-78, 5 photos. Nov. 1957.

The U. S. has more game and more kinds of game than before white men came. Things are getting better and better. Overpopulations of deer are common. Upland birds frequently are underharvested. Furbearers such as fox and raccoon are increasing. There are bounties on other mammals; if game were scarce, these would be on game list instead of vermin list. Squirrels are spreading through the plains via windbreaks. Waterfowl are increasing. Why is all this superabundance of game that we didn't realize we had? Six explanations are offered: 1. Forest cutting favors several species. 2. Heavy grazing causes excess of forbs and shrubs, which favor certain species. 3. Construction of thousands of farm ponds, reservoirs, and stock-watering places provides drinking water and breeding places. 4. Soil conservation practices have improved capacity of millions of acres to support wildlife. 5. Farm crops provide higher quality wildlife foods than the original vegetation. 6. Some cover has been destroyed, but in its place we have fence rows, windbreaks, shelterbelts, ditchbanks, canal banks, roadsides, grassed waterways, and terraces in fields. "I am confident that 10, 50, and 100 years from now, the ability of the land and water, of the United States and of the world, to support people and wildlife will be greater than it is today, and that our populations of fish and wildlife also will be greater."

Bromley, A. W. (N. Y. State Cons. Dept.) WILDLIFE AREAS IN RELATION TO LAND UTILIZATION. J. Soil & Water Cons. 12(5): 242-244, 6 photos. Sept. 1957.

Human populations are growing. Hunting and fishing are becoming more and more popular. But wildlife lands are dwindling because of drainage, urbanization, highway construction, etc. Among steps that should be taken are: 1. Harmonize governmental programs so that different agencies will not be working in different directions. Creation of a federal department of natural resources should be an effective means. 2. Use state and federal monies to acquire as much wildlife land as possible, especially wetlands. 3. More multiple use on public lands. 4. Closer cooperation between public agencies and landowners to develop comprehensive conservation programs for specific areas. 5. More education of public.

Edwards, R. Y., and C. D. Fowle. (B. C. For. Serv., Victoria.) HARMONY OR DISCORD? A CRITICAL LOOK AT WILDLIFE MANAGEMENT. J. Wildl. Mgt. 21(3): 349-350. July 1957.

Twenty years from now, "Will we still be pointing with pride to a few thousand yards of multiflora hedge or a few acres of deer browse regenerating in the path of a bulldozer while other men punch holes in mountains to drain rivers of the kilowatts, erect skyscraping, low-cost apartment houses, or make the Great Lakes accessible to ocean liners?" Do we have our noses too close to narrow, specialized objectives? Do we exist to guide the public or just to serve a vociferous minority? Where do we fit best into the mosaic of human affairs? Wildlife men can have little land to manage for their own purposes. Land use is dictated by farmers, foresters, city planners, and engineers. There is much talk of multiple use but little practice. Wildlife work must be integrated with activities of others if it is to be of real significance. It must

be done on the other man's land and with the other man's tools. We cannot blindly multiply game without considering crop damage, or without considering public demand for other types of outdoor recreation. The best use of a given area should be determined by sociologists, economists, and ecologists. But the decision is not always governed by economics: public wishes may dictate decision on aesthetic grounds. The trend is toward more interest in wildlife and the outdoors in general, not just in game. There would still be wildlife if there were no wildlife management. The measure of our success is the degree to which our efforts narrow the gap between what people now and in the future would get without us, and what they want and need. For this, wildlife knowledge is not enough. We need cooperation, coordination, and consideration of trends in public interests.

Silver, Helenette. (N. H. Game Dept.) A HISTORY OF NEW HAMPSHIRE GAME AND FURBEARERS. N. H. Fish & Game Dept., Surv. Rep. no. 6. xiv + 466 p., illus. May 1957. $2.85, cloth.

The most comprehensive work of the sort that the reviewer has seen. A volume of high significance to layman or professional concerned with game or early natural conditions in the NE. Although readable, with quantitative material relegated to tables, graphs, and appendix, the book contains an enormous amount of good information. It is based on a great deal of historical and biological research by many people. Part I describes forests, clearings, human populations, and land use in Indian days. It tells how settlement by whites developed, what game abundance was found, and traces history of fur trade. It gives the history and present status of agriculture, lumbering, erosion, and hunting. History and regulations of the game department are followed from early days. Economic value of wildlife, and damage done by wildlife, are discussed historically with consideration of bounties and damage payments. Refuges and management areas in N. H. are discussed. Results of the state's many wildlife research projects are summarized in useful detail. Part II takes up the game and fur mammals species by species, telling whatever is known about the history of their distribution, populations, harvests through the years, habitat conditions, economic status, and management problems. Part III does the same for birds. It has a long section on ruffed grouse and shorter, but adequate ones, on the other upland game birds. One chapter is devoted to shore birds, one to waterfowl, and one to doves and pigeons. Appendix, 13-p. bibliography, and index complete the volume.. At $2.85, the book is sold well below cost and is an excellent bargain for any wildlife library.

WILDLIFE--HUNTING AREAS & PROBLEMS

Berryman, Jack H. (US F&WS, Minneapolis, Minn.) OUR GROWING NEED: A PLACE TO PRODUCE AND HARVEST WILDLIFE. J. Wildl. Mgt. 21(3): 319-323. July 1957.

The problem of shrinking production habitat and increasing public-hunting needs is reviewed as related to population increases, license-buyer density, and land ownership in the Midwest. Various management measures designed to solve the problem are discussed. It is proposed that the solution to the problem is to develop a system for compensating the landowner, and that this is the responsibility of the wildlife agencies. The legal and economic bases for the proposal are reviewed and examples cited. The paper proposes that a committee representing the various interests involved be named to work out a system of payment to the landowner, and that such a system is essential to the future of public hunting.--Author's summary.

Davison, Verne E. (US Soil Cons. Serv., Auburn, Ala.) FISH AND WILDLIFE - AGRICULTURAL SLANT. Presented at 11th Ann. Conf. SE. Assn. Game & Fish Comms. 5 p., mimeo. Oct. 1957.

Production or lack of production of game depends mainly on the farmer and rancher. How can we get more farmers to favor wildlife? The simplest American way is for individual hunters or fishermen to pay landowners for the recreation they expect to enjoy. The individual hunter, it appears, will have to make wildlife management profitable on the land where he wishes to hunt. "These are facts regarding the relationship of agriculture to fish and wildlife. The educational and informational efforts of all wildlife and agricultural organizations might well be directed toward helping hunters, fishermen and wildlife workers understand them."

Dickey, Charles. (Rt. 2, Box 316-D, Greenwood, S. C.) [SORGHUMS FOR SHOOTING PRESERVES.] Modern Game Breeding 27(3): 12-16, 5 photos. Mar. 1957. [Reprints available from Sportsmen's Service Bureau, 250 E. 43d St., N. Y. 17, N. Y.]

Discusses the properties of many new and old kinds of sorghums that are or may be of exceptional value to shooting-preserve operators and others who make plantings for game. Tells how to plant and grow sorgums to avoid common errors, and tells where to get further information. Commercial sorghums are annuals. Wise land managers will add perennial plants of various kinds each year to cut down on annual planting.

Dickey, Charles H. SHOOTING PRESERVE MANAGEMENT. Sportsmen's Service Bureau, 250 E. 43rd St., N. Y. 17, N. Y. 32 p., illus. July 1957. Available on request.

This booklet is a revision, with additions, of the series of detailed articles that appeared in the Feb. 1956 issue of Modern Game Breeding. Its sections are: Successful shooting preserve management, Cover for shooting preserves, Shooting preserves must provide dogs, Cannibalism--the game breeders biggest headache, Public relations and advertising, and Tips for shooting preserve operators. In WR (85: 13) we said of the original series: "...a well rounded, authoritative account that covers more ins and outs of the subject than anything else the reviewer has seen. It is filled with a great amount of practical, down-to-earth advice to operators on handling birds, hunters, dogs, cover, and advertising. Sources of information on special topics are freely cited. The section on cover development is especially interesting in its emphasis on adaptations needed for the specialized requirements of commercial hunting. The discussion of cannibalism is surprisingly detailed." Part of the information is of value only to shooting preserve operators and their customers, but much of it is of interest to technicians who are planning farm-wildlife programs or public shooting grounds. Available from the same publisher is a folder, "Looking for a place to hunt?" which lists shooting preserves by states, with indication of address, telephone, and types of game provided.

WILDLIFE--ECONOMIC & OTHER VALUES

Alabama. HUNTING AND FISHING DOLLARS. Ala. Cons. 28(4): 20-21, illus. Feb.-Mar. 1957.

Summary of findings from Crossley S-D Surveys' study of hunting and fishing economics in Ala. A longer report on the survey was reviewed in WR 88: 12.

Ariz. THE SPORTSMAN'S DOLLAR AND WHAT IT MEANS TO ARIZONA. Ariz. Game & Fish Dept. Wildl. News 4(4): 3, 11. Fall 1957.

Results of questionnaire survey of expenditures by hunters and fishermen. Tables show expenditures made for various goods and services, and expenditures made for fishing and for given types of hunting. The total, $43,095,000 in 1956, exceeds by $4 million a year the combined value of all the hay, sheep, wool, citrus, eggs, poultry, seed crops, grapes, and wheat. Chief costs to sportsmen were, in order: transportation, food and lodging, boats and motors, guns and optical equipment. Fishing was by far the largest cause of expenditures, followed by hunting for deer, small game, javelina, waterfowl, and turkey.

WILDLIFE--FOOD HABITS & TECHNIQUES

French, C. E., S. A. Liscinsky, and D. R. Miller. (Pa. State U.) NUTRIENT COMPOSITION OF EARTHWORMS. J. Wildl. Mgt. 21(3): 348. July 1957.

Three species of earthworms that constitute important foods for migratory birds and several mammals were analyzed for the major nutrients. On the fresh basis, as consumed by wildlife, they contained approximately 83% moisture, 8-9% protein, 3% ash (minerals), 3% carbohydrate, 1% fat and 1 Cal. per g. energy.--C. E. French.

Korschgen, Leroy J. (Mo. Cons. Comm.) FOOD HABITS OF COYOTES, FOXES, HOUSE CATS AND BOBCATS IN MISSOURI. Mo. Cons. Comm., P-R Series no. 15. ii + 64 p. May 1957.

A major food-habits study based on analyses of stomachs of 770 coyotes, 1006 red foxes, 352 gray foxes, 110 house cats, and 46 bobcats. Many of these stomachs were taken in the course of control work; they may give a more than av. picture of predation on domestic and game animals. Results are tabulated in detail by both occurrence and volume and are discussed in text. A fine feature of the paper is that previous food-habits studies of the species are reviewed and cited. Main foods of coyote (in percentages by volume) were: rabbits 54, poultry 11, livestock 9, mice and rats 9, other mammals 8, and carrion 6. Main foods of red fox were: rabbits 37, mice and rats 22, poultry 14, other mammals 8, carrion 8, livestock 5. Main foods of gray fox were: rabbits 45, mice and rats 20, chicken 9, other birds 7. Predation by coyotes and foxes may have had an effect on numbers of rabbits, but if so it was temporary. Main foods of bobcat were: rabbit 70, fox squirrel 9, deer 8, turkey 7. Clearly, the bobcat record does not look good to the hunter. Main foods of house cat were: mice and rats 60, rabbits 23. Birds were minor items in house cat diet; the charge of wholesale bird killing commonly made against cats was not supported. Korschgen doubts that there are many truly feral house cats. On the whole, the house cat appears to be the most beneficial of the species reported on in this paper. Sex ratios of coyotes and foxes are discussed, as are general findings of the study.

WILDLIFE--PREDATION, CROP DAMAGE, CONTROL

Hanlon, Robert W. (St. Augustine's Coll., Nassau, Bahamas.) AN ANALYSIS OF THE BOUNTY SYSTEM IN MINNESOTA AND ITS IMPACT ON CONSERVATION EDUCATION. M.S. thesis, Mankato State Teach. Coll., Mankato, Minn. 61 p. 1956.

Based on records back to 1943, with emphasis on 1954. Predators are bountied in county in which taken. Payments are handled through county auditors' offices. The system cost Minn. $267,825 in 1954. In same period, Iowa spent $145,235 on bounties, Wis. $91,260, and S. Dak. $134,638. 171 wolves bountied in 1954 cost Minn. $5,885; St. Louis Co. claimed 38.6% of these Fish and Game monies. Bounties for 1881 coyotes cost $49,325. 1543 bobcats accounted for $23,155. Bears, bountied in 8 counties, cost $1,765. 40,422 foxes cost state and counties $144,680, 50% of all bounty monies. Inequality in amount of payment between counties, and 8 methods of marking bountied foxes, encourage fraud. County bounties on gophers, woodchucks, crows, and rattlesnakes accounted for $34,099 in 1954. This does not include some $8,000 paid in counties from which complete records could not be obtained. Records from 1943 on indicate no trend in conflict with findings from 1954 data. Long-range pictures of bounty payments do not indicate that any degree of control is being maintained.--Author.

Schütte, F. EICHENWICKLER, WALDAMEISEN UND VÖGEL. Waldhygiene 1: 215-219. 1956. [From abstract by J. A. G., Ibis 99(3).]

"An attempt to assess the effects of the presence or absence of wood ants and hole-nesting birds on the numbers of the defoliator Tortrix viridana L., in three sample plots of oak woodland. Defoliation was most severe in the plot with neither ants nor nest-boxes, less severe in the plot with nest-boxes but no ants, and least where both ants and nest-boxes were present."

WILDLIFE--REPORTS OF ORGANIZATIONS & REPORTS OF HARVESTS

Cape of Good Hope. DEPARTMENT OF NATURE CONSERVATION / REPORT NO. 12 / 1956. Prov. Admin., Cape of Good Hope, Dept. Nat. Cons., Cape Town, S. Africa. 89 p., illus. Rec'd Nov. 1957.

The province has many difficult problems blocking the way to an effective, well-rounded program of conservation and restoration. Steps in the right direction are being made. Hunting regulations are being improved. The DeHoop wildlife farm has been established for breeding and redistribution of native game mammals and birds. The Jonkershoek Nature Reserve is now being managed chiefly for waterfowl production. Landowners are anxious to obtain animals from these stations for restoration work. Many large animals are exterminated

or very rare in the province. Mtn. zebras remain in 5 herds totaling about 126. Several kinds of pests, including baboons, have increased, and many species are on the bounty list. Bounties are still the main control system. A special study was made of this system. It was concluded that bounties are bad. In 30 years they have not achieved any marked reduction of pests, but they have contributed to extermination of rare forms. Some valuable animals remain on the list. Actually, only 4 spp. require general control. Bounties encourage fraud and they have no sound basis. Their abolition is recommended. Instead, technical advice on control should be given landowners, perhaps with direct control of the 4 major pests. Control research should be done, jackal hounds should be bred and distributed, hunters should be trained for control, and various forms of wildlife should be bred and distributed to form buffer populations to take predator pressure. Funds now spent on bounties would cover all these measures. Other sections of this publication discuss management and conservation of vegetation, fisheries work, and museums.

North Carolina. FIFTH BIENNIAL REPORT OF THE...WILDLIFE RESOURCES COMMISSION, JULY 1, 1954 TO JUNE 30, 1956. 96 p., illus. 1957.

Includes a table (p. 41) showing kills of all species or groups of game in N. C. in each of the 5 years, 1949-55.

Transvaal. FAUNA & FLORA NO. 6. Govt. Printer, Pretoria. 151 p., illus. 1955 [1957?]. Available from Director of Nature Cons., P. O. Box 383, Pretoria. No price stated.

The Transvaal Dept. of Nature Conservation, which corresponds roughly to one of our state game departments, presents here much information on progress in fisheries management and game restoration. Both are being attacked scientifically and with due regard for native species. Game, which here means ungulates of many sorts, was greatly reduced at an early date. Some ranchers, however, preserved scattered herds of most species. Now the province has set up nature reserves on which scarce species are increased and distributed to landowners who wish to establish new herds. Several species are being brought back from dangerously low levels. A few species still need little aid from man. A major paper of the volume reports in detail on numerical status and present distribution of practically all ungulate species of Transvaal, and how these species are making out under present conditions. Other papers tell of the history of the Lombard, Loskopdam, and Fyfe nature reserves. One reports a technical survey of mammals of the Lombard Reserve. History and status of bontebok and sable antelope are treated in 2 papers. An effective cage-trap for baboons is figured and discussed. There are also 3 fisheries papers. The book does not review all official activities as our state annual game reports do, but it presents much information of reference calibre on status, distribution, and preservation of ungulates. The whole text is in both English and Afrikaans.

West Virginia. ANNUAL REPORT OF CONSERVATION COMMISSION. W. Va. Wildl. 21(8): 1-36 p., illus. Oct. 1957.

C. O. Handley's report on Game Management occupies p. 13-20. It discusses status and kills of various game animals and tells what was done on the several management areas. Kill of black bear dropped from 83 to 58, a 48% decline. Of these kills, 16% were illegal and 12% were of cubs. Kill of turkey dropped 22% as productivity dropped from 3.3 young per adult hen in 1955 to 1.3 in 1956. Probable causes were cold, wet weather in spring and summer and poor supply of winter food.

WETLANDS & WILDLIFE

Darsie, Richard F., Jr., and Paul F. Springer. (Del. Agr. Exp. Sta., Newark.) THREE-YEAR INVESTIGATION OF MOSQUITO BREEDING IN NATURAL AND IMPOUNDED TIDAL MARSHES IN DELAWARE. Del. Agr. Exp. Sta. (Newark), Bul. no. 320 (Technical). 1-65 p., 10 figs. June 1957.

The most extensive report yet published on relation of mosquito production to impoundments made for wildlife, especially waterfowl. It includes a great deal of quantitative information on mosquito breeding and wildlife use of fresh-water impoundments and natural tidal marsh at Bombay Hook Refuge, Del.

"The net effect of fresh-water flooding was a significant reduction of nuisance mosquitoes in an important breeding zone and greatly enhanced conditions for waterfowl and certain other marsh birds. To minimize most effectively the mosquito nuisance and to provide conditions favorable for waterfowl in impoundments, it is recommended that, where possible, a combination of the flooding and draw-down management be practiced." The impoundment approach can be used in a variety of situations, with either fresh or saline waters. As the authors point out, greater public support can be obtained for a project that serves both for mosquito abatement and wildlife management than for a project that serves only one of these.

Harris, Stanley Warren. ECOLOGICAL EFFECTS OF DRAWDOWN OPERATIONS FOR THE PURPOSE OF IMPROVING WATERFOWL HABITAT. Ph.D. thesis, U. Minn. 209 p. 1957. [From long abstract in Dissertation Abstracts 17(9).]

Based on work at Mud Lake Natl. Refuge, Minn. Type of vegetation on mud flats in first year depended on seed availability, soil, moisture, year, season, duration of drawdown, and masses of stranded algae. In 2d year, emergents decreased while upland and shore weeds increased. Stands exposed before Aug. lost emergents in 2d year; reverse was true of exposure in or after Aug. In long drawdowns, soil dried and dense willow stands appeared in 5 years. Reflooding favored emergents and aquatics. Flooding of more than 15 in. killed spikerush and soft-stem bulrush in 3 years, common cattail (but not hybrid cattail) and sedges in 4 years. Willows 2 years old were killed in 2-4 years by any flooding; those of 4-5 years were killed only when flooded 24 in. for 3-4 years. Drawdowns of 1 or 2 years at 5-10 year intervals were required to maintain marshes of emergents. Sago thrived first year of reflooding. After reflooding, old cattail beds were about same as before 2-year drawdown. Shallows and mud flats were heavily used by river ducks in summer and fall. Broods heavily used some open water areas, but not dense marshes. Coot nesting was heavy in drawdown marshes of light and moderate density. Dense willow stands were hardly used by waterfowl. Bad effects of drawdowns may have been a botulism outbreak and closure of shore by willows and weeds. Management of emergent habitat requires (1) variety of types, (2) interspersion, and (3) proper density of the types. At present level of knowledge, drawdowns should be used only for relatively specific purposes, with proper control and study, rather than on widespread basis. Appendix gives data on germination and establishment of soft-stem bulrush and on swarms of hybrid cattails.

Hudson, M. S., and Bee Hudson. (Wofford Coll., Spartanburg, S. C.) A LABORATORY TEST FOR SCREENING CHEMICALS FOR TOXICITY TO SUBMERGED AQUATIC PLANTS. Weeds 5(4): 371-373, 1 photo. Oct. 1957.

Tells how to grow these plants in quart jars. Test plants were Ceratophylum and Anacharis. "Nearly 200 chemicals were tested by this screening method and two were found which killed the plants at a concentration of 1 ppm or less. These were methyl rosaniline chloride and 1-chloro-2,4-dinitrobenzene."

Kurz, Herman, and Kenneth Wagner. TIDAL MARSHES OF THE GULF AND ATLANTIC COASTS OF NORTHERN FLORIDA AND CHARLESTON, SOUTH CAROLINA. Fla. State U. Studies no. 24. viii + 168 p., 32 figs. 1957. $1.00, paper.

Detailed study of a gently sloping coast that is being submerged under the sea at the rate of 6 inches in 25 years. Effects of submergence are clearly evident in topography and vegetation. Tidal action is also important, of course. Slight differences in elevation have striking effects on vegetation and its zonation. The paper gives a good account of these matters and many others. It presents discussions of soils, salinity of soils, salt-tolerance of plant species, variations in pH, pH tolerance of plant species, consequences of elevation in relation to sea level, variations in and effects of tides, and plant succession in the several habitats. Diagrams and photographs illustrate processes and conditions. The paper should be of value and interest to all workers concerned with tidal marshes and factors that govern changes in them.

Loveless, Charles M. (Fla. Game Comm.) CLIPPING STUDY TECHNIQUES IN MARSH ECOLOGY INVESTIGATIONS. Presented at 11th Ann. Conf. SE. Assn. Game & Fish Comms. 15 p., mimeo. Oct. 1957.

Describes 2 methods used to study Everglades vegetation. "One technique has been designed to investigate the effects of water levels on sawgrass and consists of clipping and weighing the plant material from randomly selected quadrats on three different sites each subjected to different hydroperiod cycles. The study is conducted annually and serves as an estimate of sawgrass stand density fluctuations that are considered to be related to mean water levels. A transect sample plot method is being employed to study the plant communities over the entire 136,000-acre Conservation Area 2. This method consists of clipping and weighing all plant species occurring in randomly selected sample units located along a predetermined transect line. In both studies a square meter quadrat frame serves as the sample unit. Data are analyzed by calculating a population mean in pounds of plant material per square meter. The sample error is estimated for the important plant species and confidence limits established at the 95% probability level. The population mean value per square meter is expanded to pounds per acre when applicable. Differences between areas, sites and years are tested for significance. It is believed that these study techniques are suitable for examining certain aquatic plant communities as methods are designed to give reasonably valid, quantitative data at a minimum expenditure of time and effort."

Manson, Philip W. (Dept. Agr. Engin., U. Minn.) WATER AND AGRICULTURAL LAND. Cons. Volunteer 20(118): 34-43, 4 figs. July-Aug. 1957.

Tells why agricultural drainage, as of potholes, is a sound conservation practice and is not detrimental to the water supply. Concrete evidence is given to support the following statements: "1. Farm drainage does not remove capillary water from the soil that is needed for the production of crops. 2. Farm drainage in no way affects the main source of precipitation. 3. Farm drainage does not cause droughts nor does it alter the precipitation pattern. 4. Farm drainage does not affect major floods. 5. Farm drainage does not appreciably affect the groundwater supply of deep wells." According to author, drainage of potholes has little or no effect on level of watertable or on levels of any wells except those that are only a few feet deep and located close to a drain. Lower levels in deep wells are attributed to heavier use in recent years.

Moyle, John B. (Minn. Dept. Cons.) MINNESOTA'S FAMOUS WILD RICE. Cons. Volunteer 20(119): 38-44, 2 photos. Sept.-Oct. 1957.

Acreage, manner of growth, method of harvest, size of seed crop, frequency of crop, habitat factors, possibilities of cultivation, how to store seed for planting, and how to cook it.

Moyle, John B. (Minn. Dept. Cons.) THE STORY OF 98 LAKES. Cons. Volunteer 20(119): 30-31. Sept.-Oct. 1957.

How much good use is made of land obtained by draining lakes and ponds? To answer this, 98 Minn. lakes drained before 1928 were studied. Of the total acreage, only 28% was tilled land, 16.2% was pasture, 1.5% was hayland, and 0.1% was wooded. Thus less than half the area was agricultural land. Rest of area was: waterfowl lake, 33.9%; open grassy swamp, 14.9%; brushy swamp, 1.9%; fish lake 0.8%; and other, 2.7%.

Snow, J. R. (US F&WS, Marion, Ala.) A PRELIMINARY REPORT ON THE COMPARATIVE TESTING OF THE NEWER HERBICIDES. Presented at 11th Ann. Conf. SE. Assn. Game & Fish Comms. ii + 11 p., mimeo. Oct. 1957.

Tests were conducted for 3 years on small plots of plants such as cattail, cord grass, cut-grass, lizard's tail, reed grass, sedges, water shield, and water lily. "On the species of weeds treated, Dalapon, Amizol, the propylene glycol butyl ether ester of 2,4-D and CMU were most effective when used alone. Combinations of TCA-Kuron, Dalapon-Kuron, Amizol-Kuron, Amizol-Erbon, TCA-Erbon, Amizol-Dalapon and Dalapon-2,4-D were as effective in killing the vegetation treated as was the standard 2,4-D ester in oil treatment. Generally a combination of two herbicides gave better results than either of the agents used alone. CMU was the only herbicide tested which had strong residual effects although several of the treatments exhibited residual effects extending into the season following the one in which they were applied." Table shows recommended treatment for each species of plant sprayed.

Swindale, Delle N., and John T. Curtis. (U. Wis.) PHYTOSOCIOLOGY OF THE LARGER SUBMERGED PLANTS IN WISCONSIN LAKES. Ecology 38(3): 397-407, 7 figs. July 1957.

West, Jack W. (S. C. Wildl. Resources Dept.) CONTROL OF POND WEEDS IS REAL PROBLEM. S. C. Wildl. 4(3): 5-7. Summer 1957.
Instructions and tabular data for control of various kinds of weeds in farm ponds by use of herbicides and other methods.

Wick, Wm. Q., and Harte E. Penttila. (Wash. Dept. Game, Mt. Vernon.) OBSERVATIONS ON A COOT-MUSKRAT RELATIONSHIP. Condor 59(5): 341-342. Sept.-Oct. 1957.
Muskrats of a bog lake in Skagit Co., Wash., dug up and chewed up roots of skunk cabbage (Lysichitum americanum). Coots quickly ate any portions dropped by muskrats.

FARMLAND & WILDLIFE

Hazel, Robert B., and Donald J. Hankla. (N. C. Wildl. Resources Comm.) NINE YEARS OF PROGRESS IN FARM GAME MANAGEMENT IN NORTH CAROLINA, 1948-1957. Presented at 11th Ann. Conf. SE. Assn. Game & Fish Comms. 23 p., proc. Oct. 1957.
Information on amount of planting stock distributed, success of plantings, wildlife use of plantings, and changes in program is given in tables and discussed at length. Original plan for demonstration areas was soon dropped owing to failure of landowners and sportsmen to cooperate. Distribution of planting stock increased year by year. More biologists were added to staff. Trouble was encountered at all times in getting material planted and plantings well maintained. Temporary employment of local leaders among farmers was helpful in getting more and better plantings made. At first, plants used were multiflora rose, bicolor and sericea lespedeza. Added later were annual food patches, annual lespedeza planted with bicolor, and some fencing of plantings. Lespedeza VA-70 proved superior to bicolor in certain ways: it dies back each year, stools out prolifically, seeds as well as bicolor, and is suitable for more soil and climatic conditions. Plans for intensive farm-wildlife developments were prepared for especially interested landowners. About 50% of shrub lespedeza plantings were invaded by trees, but about 60% of these plantings did well, although few were well maintained. Shrub lespedeza borders were less often destroyed by farming if they had sericea buffers. Such buffered borders were used much more by quail and rabbit than were plain shrub lespedeza borders. Seed production of shrub lespedeza was low enough that size of plots was raised from 1/8 to 1/4 acre. Multiflora hedges had varying success, but 78% of those inspected in 1953 were expected to become good enough to turn livestock. About 44% of these hedges were invaded by trees, vines, weeds, and grass and were suffering from the competition. Rose hedges were fairly well used by rabbits, less by quail. Annual patches tend to concentrate quail for hunting, but apparently are of little aid in winter unless supported by perennials.

Swenson, W. S. (Soil Cons. Serv., Colo. Springs, Colo.) SQUAWBUSH IN WINDBREAKS IN EASTERN COLORADO. J. Soil & Water Cons. 12(4): 184-185, 2 photos. July 1957.
Rhus trilobata is fine for windbreaks and wildlife plantings on the Great Plains because it is drought resistant, cold-hardy, long lived, unpalatable to livestock, tolerant of a wide range of soils, provides good cover and nesting sites, and provides seeds that are eaten by many game and other birds. Seeds persist through winter. Maximum height of plant is about 8 feet. Choice of a strain suited to local conditions is important.

RANGELAND & WILDLIFE

Allred, B. W., and F. C. Dykes, editors. FLAT TOP RANCH: THE STORY OF A GRASSLAND VENTURE. U. Okla. Press, Norman. 223 p., illus. 1957. Price not stated. [From long review by V. A. Young, J. For. 55(9).]
Charles Pettit's 17,000-acre Flat Top Ranch between Waco and Ft. Worth in Texas has been carefully managed to improve the grass and cattle. As a result,

the range withstood the drought of 1951-56 and its valleys have grass tall enough to hide cattle. Numerous specialists pooled their efforts in this book to tell what was accomplished and how it was done. In one chapter, Wm. R. Van Dersal describes the abundance of wildlife that occurred in the region in pioneer days and shows how most of the species are again flourishing because of the conservation program.

Blydenstein, John, C. R. Hungerford, G. I. Day, and R. R. Humphrey. (U. Ariz.) EFFECT OF DOMESTIC LIVESTOCK EXCLUSION ON VEGETATION IN THE SONORAN DESERT. Ecology 38(3): 522-526, 4 figs. July 1957.

Two adjacent tracts near Tucson were compared statistically. One had been protected for 50 years, the other had had occasional light grazing. "The most notable change encountered was the over-all increase in plant density on the protected area, with perennial grasses and a palatable shrub, Krameria grayi, showing the most significant increases. An exception was Franseria deltoidea which was the only dominant species with a significant decrease in density on the protected area. The other dominant species, Larrea tridentata, showed no change in density." There was little change in species composition of the vegetation.

Dyksterhuis, E. J. (US Soil Cons. Serv., Lincoln 8, Nebr.) THE SAVANNAH CONCEPT AND ITS USE. Ecology 38(3): 435-442, 8 photos. July 1957.

Discusses savannah sites and savannah types of the U. S. and their causes. There is more savannah in the U. S. than is generally recognized. Poor handling has caused some of it to take the appearance of forest. Recognition of savannah sites is essential for best land use.

Evans, Raymond A., and R. Merton Love. (U. Calif., Davis.) THE STEP-POINT METHOD OF SAMPLING--A PRACTICAL TOOL IN RANGE RESEARCH. J. Range Mgt. 10(5): 208-212, 3 figs. Sept. 1957.

Procedures for determining total ground cover and percentage cover of the herbaceous species in the stand. "Involved in the procedure is the point method using individual points and an estimate method utilizing a square-foot frame... The time required to sample an area with the step-point method was about one-sixth to one-eighth as much as required by the point-frame method..."

Hanks, R. J., and Kling L. Anderson. (Agr. Res. Serv., Manhattan, Kans.) PASTURE BURNING AND MOISTURE CONSERVATION. J. Soil & Water Cons. 12(5): 228-229. Sept. 1957.

Research in Flint Hills, Kans., indicates that destruction of surface mulch by burning, regardless of when it is done, substantially decreases water intake of soil. "From the standpoint of water conservation and forage yield, it seems wise to eliminate burning as a pasture management practice in the Flint Hills region of Kansas. Where burning is advisable for some reason, it should be delayed until late spring."

Howard, Walter E., and Burgess L. Kay. (U. Calif., Davis.) PROTECTING RANGE FORAGE PLOTS FROM RODENTS. J. Range Mgt. 10(4): 178-180, 2 photos. July 1957.

Summary: "Service station used quart oil cans show considerable promise as being effective bait stations for protecting rangeland seeding trials from rodents. They are readily available, light to transport, and effectively protect grain baits from snow and rain. The bait supply may have to be replenished every few months on small plots, but fresh bait twice a year should be adequate to protect areas of many acres in extent." The 1.25-inch hole made by the standard punch-type opener used in service stations was just right for rodents as large as kangaroo rats. Various poisons and baits used in the cans worked satisfactorily. Bait cans were placed 50-100 feet apart. To show need for control, experiment is described in which 1 captive kangaroo rat picked up in 1 night as many as 20,000 clover seeds that had been scattered over 500 sq. ft. of concrete floor.

Johnston, A. (Exp. Farm, Lethbridge, Alberta.) A COMPARISON OF THE LINE INTERCEPTION, VERTICAL POINT, QUADRAT, AND LOOP METHODS AS USED IN MEASURING BASAL AREA OF GRASSLAND VEGETATION. Can. J. Plant Sci. 37(1): 34-42. Jan. 1957. [From J. Range Mgt. 10(4).]

Kelting, Ralph W. (U. Tulsa, Okla.) WINTER BURNING IN CENTRAL OKLAHOMA GRASSLAND. Ecology 38(3): 520-522, 3 graphs. July 1957.
Burning of tall-grass prairie during dormant period in late winter apparently had little effect on most environmental factors. Maximum soil temperatures were higher in burned plot than in control. Soil-moisture conditions in the burned plot became more unfavorable as the season progressed. Burning favored early growth of grasses as opposed to forbs. Andropogon Gerardi was the only major grass species adversely affected by burning.

Longhurst, Wm. M. (U. Calif. Field Sta., Hopland, Calif.) A HISTORY OF SQUIRREL BURROW GULLY FORMATION IN RELATION TO GRAZING. J. Range Mgt. 10(4): 182-184, 6 photos. July 1957.
Burrows of Citellus beecheyi in Napa Co., Calif. rangeland started formation of extensive gullies. Certain of these gullies were restudied after 15 years. Under moderate grazing, gullies were grassed over and not actively enlarging. Under heavy grazing, gullies were large and becoming larger. Since water-enlargement of rodent burrows is a common and widespread source of gully-formation in coastal Calif., there is added strength to the argument for moderate grazing.

Malin, James C. THE GRASSLAND OF NORTH AMERICA: PROLEGOMENA TO ITS HISTORY. 3d printing, with addenda. Privately published, J. C. Malin, Lawrence, Kans. 469 p. 1956. $4.00. [From review by Calvin McMillan, Ecology 38(3).]
McMillan considers this work a penetrating, critical, yet controversial study of the ecology and ecological history of the trans-Mississippi West. The author is an historian who has a faculty for grasping the essentials of fields other than his own and for reaching independent conclusions. Among the subjects he discusses are the grass problem, plant ecology, animal ecology, climatology, geology and geography, soils, systems of classifying grassland vegetation, early explorations of the grasslands, factors in grassland equilibrium, agricultural studies, soil physics and tillage, and farm organization. Malin is strongly opposed to the Clementsian concept of climax and offers much evidence against it, emphasizing the variability and instability of stands. He also demonstrates that dust storms, fires, and sediment-laden streams were regular features of the region before the time of settlement by white men.

Reynolds, H. G. (Ariz. State Coll., Tempe.) SOME DYNAMICS OF ARIZONA'S GRASSLAND COMMUNITIES. Ariz. Cattlelog 11(10): 36-37. June 1956. [From J. Range Mgt. 10(4).]

Rogler, G. A., and R. J. Lorenz. (N. Great Plains Field Sta., Mandan, S. Dak.) NITROGEN FERTILIZATION OF NORTHERN GREAT PLAINS RANGELANDS. J. Range Mgt. 10(4): 156-160, 1 photo. July 1957.
Annual application of 90 and 30 pounds of nitrogen per acre to heavily and moderately grazed pastures caused great increase in forage. Effect was shown mainly by western wheatgrass. Two years of fertilization at 90-pound rate did more to improve a heavily grazed pasture than 6 years of complete relief from grazing. Crude protein level in herbage was higher in most fertilized plots than in controls.

Stelfox, H. B. (Exp. Farm, Lacombe, Alberta.) TWO TYPES OF CAGES FOUND SATISFACTORY FOR PASTURE STUDIES. J. Range Mgt. 10(5): 230-231, 4 figs. Sept. 1957.
Small exclosures made from steel mesh of 6" by 6" type used to reinforce concrete. One is rectangular, 1 shaped like Quonset hut. Both are low and covered, and both exclude cattle. Cost was $7.70 for the rectangular, $7.57 for the Quonset type.

Tomanek, G. W., and F. W. Albertson. (Ft. Hays Kans. State Coll., Hays.) VARIATION IN COVER, COMPOSITION, PRODUCTION, AND ROOTS OF VEGETATION ON TWO PRAIRIES IN WESTERN KANSAS. Ecol. Monog. 27(3): 267-281, 11 figs. July 1957.
Four sites were studied ecologically and with special reference to grazing. "In terms of practical grassland management you could allow the livestock to remove just half the forage produced on the moderately grazed and leave half of it to protect the soil, conserve soil moisture and store food in the roots for future use and still get as much as if the livestock ate all the grass on the heavily grazed range."

RANGELAND & WILDLIFE--Continued

Webb, Robert. RANGE STUDIES IN BANFF NATIONAL PARK, ALBERTA, 1953. Can. Wildl. Serv., Wildl. Mgt. Bul., Ser. 1, no. 13. ii + 24 p., 11 figs. 1957.
Four big-game exclosures established in 1944 and 1 established in 1952 were studied quantitatively in 1953. Plots 1, 2, and 4 were on grass-forb range. At plot 1, there were more forbs inside the exclosure; outside, grazing had suppressed forbs and favored dominance of grass. At plot 2, there were more forbs outside, because inside they were suppressed by heavy grass. Actually, there probably was more grass production outside because grass there was stimulated by moderate utilization. Proper balance of grazing pressure is highly desirable, but hard to maintain with game animals. At plot 3, reproduction and growth of aspen, willow, and birch were better inside than outside, for browsing by game had suppressed them. Game was prolonging a successional phase favorable to game, but at same time was lowering carrying capacity. Some larger aspens were killed and others were severely barked, but were recovering. Shrubby cinquefoil thrived because little eaten. At plot 4, there was less forage inside, because of suppressive effect of old grass growth. For same reason, forbs were scarcer inside. At plot 5, where willow was dominant with birch secondary, game use held back tree growth; taller trees were more numerous in the exclosure.

FORESTLAND--FORESTRY & ECOLOGY

Ahlgren, C. E., and H. L. Hansen. (Quetico-Superior Wilderness Res. Center, Ely, Minn.) SOME EFFECTS OF TEMPORARY FLOODING ON CONIFEROUS TREES. J. For. 55(9): 647-650, 2 graphs. Sept. 1957.
Reports effects on various conifers and hardwoods in n. Minn.

Anderson, C. H., and C. R. Elliot. (Exp. Farm, Ft. Vermillion, Alberta.) STUDIES ON THE ESTABLISHMENT OF CULTIVATED GRASSES AND LEGUMES ON BURNED-OVER LAND IN NORTHERN CANADA. Can. J. Plant Sci. 37(2): 97-101. Apr. 1957. [From J. Range Mgt. 10(4).]

Ching, Kim Kwong. FOREST SUCCESSION ON THE WELL-DRAINED SOIL IN THE HIGGINS LAKE AREA OF MICHIGAN. Ph.D. thesis, Mich. State U. 159 p. 1954. [From abstract in Dissertation Abstracts 17(6).]
After reviewing many physical and biological factors, the author concludes that "the forest successional trend on this cutover land will progress in the following manners: the closed canopy of an aspen or oak stand will give place to a higher genetic type, the most frequent ones are pines on the sandy upland, whereas on the better soils, the invading species would be the beech, sugar maple and yellow birch predominantly. Under the present prevailing climatic condition, on the more xeric habitat with decreasing soil moisture, a red or white pine stage may be reached before the arrival of the formation of the northeastern coniferous climax. On more hydric sites, the conifer-hardwood type is often succeeded by the northeastern deciduous forest climax."

Freeland, Forrest Dean, Jr. THE EFFECTS OF A COMPLETE CUTTING OF FOREST VEGETATION AND SUBSEQUENT ANNUAL CUTTING OF REGROWTH UPON SOME PEDOLOGIC AND HYDROLOGIC CHARACTERISTICS OF A WATERSHED IN THE SOUTHERN APPLACHIANS. Ph.D. thesis, Mich. State U. 192 p. 1956. [From abstract in Dissertation Abstracts 17(6).]

Hodgkins, Earl Joseph. SOME EARLY EFFECTS OF PRESCRIBED BURNING ON THE SOIL, FOREST FLOOR, AND VEGETATION IN THE LOBLOLLY-SHORTLEAF PINE FOREST OF THE UPPER COASTAL PLAIN OF ALABAMA. Ph.D. thesis, Mich. State U. 182 p. 1956. [From long abstract in Dissertation Abstracts 17(6).]

Hoff, C. Clayton. (U. of N. M., Albuquerque.) A COMPARISON OF SOIL, CLIMATE, AND BIOTA OF CONIFER AND ASPEN COMMUNITIES IN THE CENTRAL ROCKY MOUNTAINS. Am. Midl. Nat. 58(1): 115-140, 9 figs. July 1957.
Deals chiefly with physical factors of the environment and with a quantitative study of soil invertebrates. Aspens improve the soil and create conditions that lead to higher invertebrate populations.

Matthews, J. D. THE INFLUENCE OF WEATHER ON THE FREQUENCY OF BEECH MAST YEARS IN ENGLAND. Forestry 28(2): 107-116, illus. 1955. [From Biol. Abs. 31 (8).]

Meteorological elements of temperature, rainfall, and sunshine were correlated with the frequency of beech mast years in England, from records collected during the period 1921-1950. Significant regressions are shown between the size of the crop and the daily mean difference of air temperature from the average for the previous July, and between the size of crop and the percent of average sunshine for the previous July. It is concluded that while lack of summer rainfall has a contributory effect this is not sufficient in itself to affect significantly the size of the beech mast crop. It is noted, also, that late spring frosts locally damage the flowers, which accounts in part for variation throughout the country.--David Worley.

Moore, Wm. H. (Tenn. Game Comm.) EFFECTS OF CERTAIN PRESCRIBED FIRE TREATMENTS ON THE DISTRIBUTION OF SOME HERBACEOUS QUAIL FOOD PLANTS IN LOBLOLLY-SHORTLEAF PINE COMMUNITIES OF THE ALABAMA UPPER COASTAL PLAIN. Presented at 11th Ann. Conf. SE. Assn. Game & Fish Comms. 5 p., mimeo. Oct. 1957.

From author's abstract: "Coverage data obtained from a 50-foot line intercept placed at random in each plot was studied by analysis of variance. Desmodium spp. and the Compositae had the greatest coverage on the August-burned plots, Galactia volubilis had the greatest coverage on the January-burned plots. Lespedeza spp., Euphorbia corollata, and Tragia urticifolia had a greater coverage on the burned plots regardless of time of burning. Burning increased the area occupied by quail food plants, with the highest occupancy occurring on the August-burned plots."

Nelson, Thomas C. (SE. For. Exp. Sta., Asheville, N. C.) THE ORIGINAL FORESTS OF THE GEORGIA PIEDMONT. Ecology 38(3): 390-397, 3 figs. July 1957.

Based on study of early literature. Perhaps 2-3% of the area was flatwoods with black-jack oak stands. Between 35-40%, the red lands, had hardwoods with little or no pine; these areas are and will be hard to keep in pine. About 45%, the gray sandy lands, had mixed pine-hardwood stands of varying composition. Some 15% of the area, certain granitic lands, had cover predominately of pine; little hardwood invasion need be expected today. In general, pine was most abundant on the drier sites and practically absent in bottomlands.

Zimmerman, Dale Allen. THE JACK PINE ASSOCIATION IN THE LOWER PENINSULA OF MICHIGAN: ITS STRUCTURE AND COMPOSITION. Ph.D. thesis, U. Mich. 292 p. 1956. [From long abstract in Dissertation Abstracts 17(6).]

Distribution, regional differences, stratification, coverage, associated flora, historical changes and reasons for them, effects of soils and climate, effects of fires and lumbering, probable future.

FORESTLAND--MANAGEMENT FOR & DAMAGE BY WILDLIFE

Cook, David B., and Wm. J. Hamilton, Jr. (Cooxrox For., Stephentown Center, N. Y.) THE FOREST, THE FISHER, AND THE PORCUPINE. J. For. 55(10): 719-722, 2 figs. Oct. 1957.

Reviews range of fisher and porcupine in e. U. S. (map), damage done by porcupines, inadequacy of present methods for porcupine control, and importance of predation of fisher on porcupine. Evidence is given that fisher has greatly reduced porcupine populations in Adirondacks, and has, in fact, made it relatively rare. N. Y. regulations have permitted increase in numbers and range of fisher. It is to be hoped that fishers reinvade the Catskills and take care of the porcupines there. "Re-establishment of the fisher in areas of the United States where porcupine control is indicated might well solve, or at least minimize, the damage caused by this obnoxious rodent. We feel that it would be well worth a try."

Dick, James, and Wm. H. Lawrence. (Weyerhaeuser For. Res. Center, Centralia, Wash.) PROTECTIVE SEEDING WITH TETRAMINE-COATED DOUGLAS-FIR SEED. Weyerhaeuser Timber Co. For. Res. Notes. 1-10 p., proc. Aug. 1957.

Summary: "A planned experiment in seeding of tetramine-coated Douglas-fir to protect the natural seedfall against rodent depredation was conducted in the winter of 1956-57 on three tree farms of the Douglas-fir Region. Seedling counts on one-tenth acre plots seeded at rates of 0, 1/8, 1/4, and 1/2 pound treated seed per acre were used to measure the outcome. Results indicated that protective seeding had no influence on the first-season stocking of the plots. The study demonstrated no rodent aversion to Douglas-fir seed as a result of prior exposure to tetramine-coated seed. The results which are at variance with reported findings are analyzed. In view of the desirability of protecting natural Douglas-fir seedfall against rodents, further research is warranted on the question of protective seeding." Failure of this experiment to show significant protection may be explained by Tevis's finding that spot-seeding should be completed within 2 weeks after distribution of poisoned seed.

Dimock, Edward J., II. A COMPARISON OF TWO RODENT REPELLENTS IN BROADCAST SEEDING DOUGLAS-FIR. US For. Serv., Pac. NW. For. & Range Exp. Sta. (Portland, Ore.), Res. Paper no. 20. 1-17 p., 6 figs. May 1957.

Summary: "Test areas on the Olympic and Siuslaw National Forests were successfully restocked to Douglas-fir by broadcast seeding. Rodents were judged to be at least moderately limiting to the success of direct seeding on these areas. Results were best when seed was treated with a chemical rodent repellent, and poorest when seed was untreated. Endrin and tetramine, the two repellents under test, were inconsistent in superiority--the former ranked first on the Olympic; the latter gave best results on the Siuslaw. Unseeded check areas showed that these results were not complicated by regeneration resulting from natural seedfall, and further demonstrated that artificial broadcast seeding can be a successful means of securing initial regeneration. More refined experimental technique and increased replication are probably necessary in broadcast seeding tests."

Gysel, L. W. (Mich. State U., E. Lansing.) EFFECTS OF DIFFERENT METHODS OF RELEASING PINE ON WILDLIFE FOOD AND COVER. Down to Earth 13(2): 2-3. 1957.

Pine-release experiments on Pine R. Exp. For. in Lower Mich. Natl. For. provided excellent opportunity to study changes resulting from various treatments and to interpret these changes in terms of wildlife food and cover. In stands released by cutting and girdling, sprouts were numerous and fast growing. In stands treated by chemicals, sprouts were fewer and smaller. After release, dense ground cover of grasses, forbs, tall berry-producing shrubs, tree sprouts, and red pine made environmental conditions that appeared to be ideal for deer, rabbits, grouse, and other forest animals.--Author.

Gysel, Leslie W. (Mich. State U.) ACORN PRODUCTION ON GOOD, MEDIUM, AND POOR OAK SITES IN SOUTHERN MICHIGAN. J. For. 55(8): 570-574, 1 graph. Aug. 1957.

White, red, and black oaks were studied on 3 tracts with aid of seed traps. Production of black oak acorns on medium and poor sites was about double that of red oak on good sites. Production of white oak acorns was relatively small; it was about the same on good and medium sites. By weight, red oak on good site produced about 1/3 more than black oak on medium and poor sites. Yield of white oak was about 1/6 that of red oak. Annual trend of production was similar for black and red oaks, but somewhat different for white oaks. Proportion of sound acorns was greatest on medium site, next on good site. In all stands, most acorns were eaten by wildlife and insects. Red oak and white oak acorns from the good site were highest in ash, calcium, and nitrogen-free extract. Red oak was also lowest in protein. White oak and black oak acorns from medium site were highest in protein. For squirrels, the stand of black and white oaks on medium site appeared to be most valuable. Acorns of these species are nutritious and are preferred by squirrels. In 1 of 5 years, enough red and black oak acorns survived on good and medium sites to give partial stocking of seedlings in a heavily cut stand. Few seedlings probably were produced in other years.

Arata, Andrew A. (S. Ill. U., Carbondale.) TRAPPING THE STRIPLANDS. Ill. Wildl. 12(4): 5-6, 2 photos. Sept. 1957.

Habits and production of fur animals were studied in old strip-mined area in s. Ill. Ten to 20% of area was in water, most of which was 10-40 ft. deep. Muskrats appeared early, feeding on sweet clover, goldenrod, and broomsedge until cattails and bulrushes appeared. On the area there were 360 active dens, nearly 3 per acre of water. Highest population was on a pond that had 9 muskrat dens per acre. Reproduction of muskrats was a little low; ?? had 2 litters, av. 3-4 young, per year. The 1955-56 catch on the 920-acre study area was 102 muskrats, 17 raccoons, and 5 minks. Catch in 1956-57 was 105 muskrats and 25 raccoons. More than $150 a year was earned from fur from the 920 acres. Several stripped areas in the region have thriving beaver populations. Beavers, like muskrats, use ground dens in stripped areas. "Management practices that would make strip-mine ponds attractive to furbearers and waterfowl are feasible in some areas. Bulldozing, to level the banks of the ponds, would form extensive shallows which could be planted to acceptable furbearer and waterfowl foods. In some ponds, water level control structures may be of value."

Bramble, W. C., W. R. Byrnes, and D. P. Worley. (Pa. State U.) EFFECTS OF CERTAIN COMMON BRUSH CONTROL TECHNIQUES AND MATERIALS ON GAME FOOD AND COVER ON A POWER LINE RIGHT-OF-WAY. Pa. State U., Agr. Exp. Sta. (U. Park.), Prog. Rep. 175. 4 p., 6 photos. July 1957.

Summary: "Four years after spraying a power line right-of-way with herbicides, a comparison of five techniques indicates that by use of basal sprays a stable ground cover can be maintained with minimum disturbance. Such cover has proven useful to several important game species. On the other hand, broadcast spraying resulted in drastic alterations of the low plant cover which has been slowly progressing towards a more stable condition. The broadcast spray areas are used by several important wildlife species. All techniques produced a 94 per cent or higher top kill of woody brush owing to thorough applications of high volumes of spray. Summer basal spray proved to be effective on hard-to-kill mixed oak and maple brush and produced a maximum control of brush coupled with minimum disturbance of low plant cover. It also preserved several valuable wildlife shrubs that were nearly eliminated by broadcast and semi-basal sprays. Winter basal spraying gave excellent kills on oak and maple brush, but was difficult to apply effectively on scattered single stems in the winter months. Oil-water, semi-basal spray and the broadcast Ammate spray proved to be highly effective treatments that produced minimum resurge on all woody brush. Ammate and D + T broadcast foliage sprays were particularly effective when coupled with a follow-up summer basal spray made the year after the broadcast applications."

Egler, Frank E. (Aton For., Norfolk, Conn.) ROADSIDE SPRAYING--BOON OR BANE? Bul. Garden Club Am. 45(5): 57-60. Sept. 1957.

Herbicides can be boon or bane. Too often they are applied broadcast for no good reason and with no consideration of the vegetation. "All the broad-leaved vegetation is burned bright brown, but rootkill of unwanted trees is rare; destruction to shrubs and flowers is excessive. These brown-outs are rarely permissible and reasonable... Discriminate selective spraying, on the other hand, uses unspectacular equipment, applying a strong solution of the chemical in oil to the basal bark or the cut stub. Sometimes, but not always, this can be a more costly treatment in the first year or two, but future maintenance is low. Native blueberries, huckleberries, sweetfern and hay-scented fern remain stable for many years." Also available from author is list (dated Feb. 1, 1957) of 33 publications on brush control recommendations for rightofways.

Leisman, Gilbert A. (Kans. State Teach. Coll., Emporia.) A VEGETATION AND SOIL CHRONOSEQUENCE ON THE MESABI IRON RANGE SPOIL BANKS, MINNESOTA. Ecol. Monog. 27(3): 221-245, 16 figs. July 1957.

STRIPPED LAND & MISCELLANEOUS HABITATS--Continued

Schreiber, M. M., and S. N. Fertig. 1957 WEED CONTROL IN FIELD CROPS. Cornell Ext. Bul. 821. 4-p. folder. Rev. Jan. 1957.

Enthusiastically advocates complete control of roadside weeds and brush. Herbicides do not hurt domestic animals. Roadside wildflowers include many serious weeds that spread to fields. "The elimination of cover for game has also been emphasized as an objection to roadside spraying. Actually, the emphasis should be on the removal of brush and weeds to protect wildlife from roadside slaughter. The value of brush and weeds along roadsides as food and cover for game has not only been over-emphasized but unwisely recommended in view of the heavy traffic on today's highways. It is not a matter of keeping cover close to the roadsides but moving it away that should be emphasized. The answer, it would appear, should be the establishment of roadside parks, game-management areas, wildlife preserves, and bird sanctuaries away from main-traveled roads. This would give food, cover, and protection that is real--not imaginary." [Since the authors are, in essence, urging elimination of weeds and brush everywhere around agricultural areas, they would leave wildlife cover of this sort only in areas assigned to wildlife. Execution of the policy would destroy practically all farm-game cover that we have left.] The paper contains a long table of herbicidal treatments recommended for control of various weeds and woody plants.

CONTROL OF UPLAND VEGETATION WITH HERBICIDES ETC.

Leonard, O. A. (U. Calif., Davis.) EFFECT OF PHENOXY HERBICIDE CONCENTRATES APPLIED TO CUTS OF SPROUTING TREE SPECIES. Weeds 5(4): 291-303, 2 photos. Oct. 1957.

"The effect of 2,4-D, 2,4,5,-T, 2-(2,4-DP), and 2-(2,4,5,-TP) concentrates applied to cuts in stems of interior live oak, black oak, and madrone are reported in the present study. The relationship of spacing of the cuts, dosage, seasonal changes in sensitivity, and other factors were studied."

Lotti, Thomas. AN EFFECTIVE CONTROL FOR CULL HARDWOODS. US For. Serv., SE. For. Exp. Sta. (Asheville, N. C.), Res. Notes no. 108. 2 p. Sept. 1957.

A mixture of one part 2,4,5-T (4 lbs. acid) to 20 parts fuel oil was applied in frill-girdles in late May and early June. The treatment killed a wide variety of hardwoods at low cost.

Ray, Hurlon. (Soil Cons. Serv., Fayetteville, Ark.) NEW DEVELOPMENTS IN CHEMICAL BRUSH CONTROL IN ARKANSAS. J. Range Mgt. 10(4): 151-155, 4 photos. July 1957.

Review of satisfactory procedures and tabulation of instructions for treatments recommended. Aerial, ground, and basal applications are considered. Chemicals involved are 2,4,5,-T, 2,4-D, propionic acid, and unsubstituted urea (Monuron). Environmental factors that affect operations are discussed briefly.

MAMMALS--GENERAL

Chew, Robert M., and Ralph T. Hinegardner. (U. So. Calif., Los Angeles.) EFFECTS OF CHRONIC INSUFFICIENCY OF DRINKING WATER IN WHITE MICE. J. Mamm. 38 (3): 361-374, 3 graphs. Aug. 1957.

Physiological and behavioral effects of varying degrees of water deprivation.

Comfort, A. (Univ. Coll., London, Eng.) SURVIVAL CURVES OF MAMMALS IN CAPTIVITY. Proc. Zool. Soc. London 128(3): 349-364, 7 figs. June 1957.

Summary: "1. Life tables and survival curves were constructed for eight species of mammal [Ovis musimon, Ammotragus lervia, Capra hircus, Boselaphus tragocamelus, Canis lupus, Dolichotis patagonica, and Microtus orcadensis] from data in the records of the Zoological Society of London. 2. Upon arithmetic coordinates, all the survival curves were approximately straight lines over the period of adult life. 3. The survival curves of two species of sheep, and of hybrid wolves, were nearly identical. That of wild goats was similar in form but significantly longer in duration. 4. The data are compared with figures for wild and domestic populations of similar animals. The survival curve of

wolves was approximately similar to that of wolfhounds. The maximum longevities of domestic, wild, and zoological garden sheep were similar, but the median age reached by zoological garden sheep was lower, and the early adult mortality higher, than in wild sheep subject to predation. There was no significantly greater loss of lambs in zoological garden sheep compared with agricultural flocks. 5. The relationship between survival curves obtained under these conditions and curves for wild and for fully domestic animals is discussed."

Folk, G. E., Jr. (U. Iowa, Iowa City.) TWENTY-FOUR HOUR RHYTHMS OF MAMMALS IN A COLD ENVIRONMENT. Am. Nat. 91(858): 153-166, 13 figs. May-June 1957.

Part of symposium on "Biological Chronometry." Summary: "These experiments have consisted of systematic attempts to separate or extinguish several types of biological rhythms, as has been done in man, only this time using exercise and cold exposure. A second phase was to determine whether natural hypothermia (i.e., hibernation) would succeed in extinguishing the biological rhythms present at normal body temperature. The results provide further evidence of the remarkable fixity and nonmodifiability of most rodent biological rhythms. This was demonstrated in data which showed the close linkage in rodents of the rhythms of bladder function and muscular activity, and of heart rate and body temperature. In the hibernation experiments some evidence was obtained for regularity in awakening of dormant animals. Light and deep forms of hibernation are described."

Irving, Laurence, Knut Schmidt-Nielsen, and Norman S. B. Abrahamsen. (Arctic Health Res. Center, Anchorage, Alaska.) ON THE MELTING POINTS OF ANIMAL FATS IN COLD CLIMATES. Physiol. Zool. 30(2): 93-105. 1957. [From Biol. Abs. 31 (11).]

Melting points were determined in marrow fat of bones from legs of Alaskan red fox, wolf, dog, caribou and reindeer, and Panamanian brocket deer. Fats of low melting point are selectively deposited in distal parts of the extremities. This condition is considered to be useful or essential in preserving flexibility of the extremities of arctic animals, for these tissues are normal in operation at 0°. Selective deposition of low-melting fats in the extremities, while apparently useful in cold weather, is not an adaptation to climate. It does occur in a rather uniform and apparently homologous pattern in several species of herbivores and carnivores.--From longer abstract by L. Irving.

Riedesel, M. L., and G. E. Folk, Jr. (U. Pittsburgh, Pa.) SERUM MAGNESIUM CHANGES IN COLD-EXPOSED MAMMALS. J. Mamm. 38(3): 423-424. Aug. 1957.

Serum magnesium levels were consistently high in hibernating animals of several species. Levels soon dropped after arousal. They were not high in active or merely cold-exposed animals.

MAMMALS--FAUNAS AND MANUALS

Burt, Wm. H. (U. Mich.) MAMMALS OF THE GREAT LAKES REGION. U. Mich. Press. xv + 246 p., 54 figs. + 78 maps. 1957. $4.75, cloth; $3.25, paper.

"The Mammals of Michigan," 1946, has been revised to include mammals of those portions of nearby states and Ont. that lie within the Great Lakes drainage. The present version is somewhat handier in size, 9 x 6 x 1 in. Maps, as well as keys to skins and skulls, have been reworked and are, as before, among the best available. Maps show entire ranges in N. Am. and also ranges in region. The text has been revised slightly and expanded to include several more species. Plates and some drawings of animals have been omitted, but a small sketch of each species is included with map for the species. Introduction consists of short sections on faunal position of region, changes in mammalian fauna, economic importance of mammals, adaptive radiation, home ranges, and populations. Species accounts, which occupy most of book, give indication of size, short description, habitat statement, summary of habits, and statement of economic status. These accounts are followed by a chapter on collecting and preparing specimens, an outline of mammalian classification, illustrated keys to skins and skulls, table of dental formulae, table of measurements and life history data for each species, and lists of selected references. Subspecies are quite properly deemphasized, as this book is chiefly for college students and amateurs. On the whole, the book is well suited to its purpose and ranks well with other state or regional mammalogy books of its type.

MAMMALS--FAUNAS AND MANUALS--Continued

Ellis, Derek V. (McGill U., Montreal, Quebec.) SOME OBSERVATIONS ON MAMMALS IN THE AREA BETWEEN COPPERMINE AND POND INLET, N.W.T., DURING 1954 AND 1955. Can. Field-Nat. 71(1): 1-6, 1 map. Jan.-Mar. 1957.
Miscellaneous observations on 18 species of mammals seen in 1954-55. The species for which most information is given on habits and biology is Phoca hispida.

MAMMALS--POPULATIONS, HOME RANGES, COMMUNITIES

Davis, David E. (Johns Hopkins U. Sch. Hyg., Balt. 5, Md.) OBSERVATIONS ON THE ABUNDANCE OF KOREAN MICE. J. Mamm. 38(3): 374-377. Aug. 1957.
Summary: "Estimates of the population of the Korean long-tailed field mouse in the fall of 1953 near the 38th parallel showed that higher populations occurred on the hillsides than at the base or top of the hills. The densities were very high, being perhaps 20-50 mice per acre."

Emlen, John T., Jr., Ruth L. Hine, William A. Fuller, and Pablo Alfonso. (U. Wis.) DROPPING BOARDS FOR POPULATION STUDIES OF SMALL MAMMALS. J. Wildl. Mgt. 21(3): 300-314, 4 figs. July 1957.
Four-inch squares of plywood set out in lines or grids were used by 4 local species of small mammals as defecating stations. The incidence of visits (per cent of boards used) provides an easily obtained and reasonably standard index of population size useful for studies of population fluctuations, ecological distribution, species associations, activity rhythms, local movements, food habits, etc. Various types and colors of boards were compared and various spacings and servicing schedules were tested. Surveys made before and after population decimation on island and mainland areas gave indications of the absolute values of the indices. Comparisons of board indices with trap indices revealed a greater sensitivity of the former for certain species, notably shrews. Examples of the application of the dropping board technique are presented.--Authors.

Jones, J. Knox, Jr., and Albert A. Barber. (U. Kans. Mus. Nat. Hist.) HOME RANGES AND POPULATIONS OF SMALL MAMMALS IN CENTRAL KOREA. J. Mamm. 38(3): 377-392, 2 figs. Aug. 1957.
Summary: "The population of small mammals in the deciduous association of a mixed forest at the Central National Forest, near Seoul, Korea, was studied by live-trapping from 30 July to 27 August 1954. The same area was snap-trapped for three consecutive days and nights in late October of the same year. Seven species of small mammals were live-trapped during the August study and one additional species was taken in October. In the course of live-trapping, 123 striped field mice (Apodemus agrarius coreae) were captured a total of 857 times and 20 wood mice (Apodemus peninsulae peninsulae) a total of 174 times. Size of home range and size of population were estimated for both sexes of field mice and for male wood mice. For each of four species only one individual was taken a single time. Some life history observations, especially breeding data, are presented for several species."

Naumov, N. P. THE GEOGRAPHICAL VARIATION OF POPULATION DYNAMICS, AND EVOLUTION. J. Gen. Biol. (Moscow) 6: 37-52, 4 figs. 1945. [Bur. Anim. Pop. (Oxford) Transl. 196. Copy of translation filed in US F&WS office, US Natl. Mus., and available on loan through US Dept. Int. Library.]
Discusses population phenomena and adaptiveness of small rodents in the ecologically optimum part of their ranges as compared with ecologically and geographically marginal parts of ranges.

Naumov, N. P. MARKING OF MAMMALS AND A STUDY OF THEIR INTRASPECIFIC ASSOCIATIONS. Zool. Zh. 35(1): 3-15. 1956. [From Biol. Abs. 31(10).]
In Russian.

MAMMALS--POPULATIONS, HOME RANGES, COMMUNITIES--Continued

Tanaka, Ryo. (Kochi Women's U., Kochi, Japan.) AN ECOLOGICAL REVIEW OF SMALL-MAMMAL OUTBREAKS WITH SPECIAL REFERENCE TO THEIR ASSOCIATION WITH THE FLOWERING OF BAMBOO GRASSES. Bul. Kochi Women's U. 5(1): 20-30. Mar. 1957.
In English. Small mammal outbreaks in the Japanese islands are listed and discussed. Possible causes of the outbreaks are analysed individually. The author concludes that there is no single explanation for the various outbreaks, but that under certain circumstances food may be the limiting factor, and at these times an outbreak will be related to the flowering of bamboo grasses.--L. F. Stickel.

MAMMALS--PARASITES AND DISEASES

Connell, Robert, and A. H. Corner. (Can. Dept. Agr., Lethbridge, Alberta.) POLYMORPHUS PARADOXUS SP. NOV. (ACANTHOCEPHALA) PARASITIZING BEAVERS AND MUSKRATS IN ALBERTA, CANADA. Can. J. Zool. 35(4): 525-533, 6 figs. Aug. 1957.
Infestation was quite heavy. Intermediate host probably is an amphipod.

Gibbs, H. C. (Inst. Parasit., McGill U., Macdonald Coll. P. O., Quebec.) ON THE ROLE OF RODENTS IN THE EPIDEMIOLOGY OF HYDATID DISEASE IN THE MACKENZIE RIVER BASIN. Can. J. Comp. Med. & Vet. Sci. 21(8): 287-289. Aug. 1957.
Summary: "Attempts at infecting...Clethrionomys gapperi, Microtus pennsylvanicus and Peromyscus leucopus, with gravid segments of the cestode E. granulosus obtained from the Mackenzie River basin area proved unsuccessful. Field checks done on equal numbers of rodents of the above species to determine the incidence, if any, of natural hydatid infection showed no evidence of infection."

Levine, N. D., Virginia Ivens, and F. J. Kruidenier. (U. Ill.) NEW SPECIES OF EIMERIA FROM ARIZONA RODENTS. J. Protozool. 4(2): 80-88, 10 figs. May 1957.
Describes 11 new species from 52 rodents of 25 species. Many species of coccidia remain to be discovered in Am. rodents. There is a high degree of host specificity and many kinds of rodents have not yet been studied for these protozoan parasites.

Lubinsky, George. (Inst. Parasit., McGill U., Macdonald Coll. P. O., Quebec.) LIST OF HELMINTHS FROM ALBERTA RODENTS. Can. J. Zool. 35(5): 623-627. Oct. 1957.
32 kinds of parasites are listed with indication of host, place of occurrence in body, and general geographic locality. A second section lists parasites by hosts. Capillaria hepatica, a potential human parasite of high pathogenicity, was found in Peromyscus and Thomomys, and is common throughout Alberta.

Marchette, N. J., D. L. Lundgren, and K. L. Smart. (Ecol. Res., U. Utah, Dugway.) INTRACUTANEOUS ANTHRAX INFECTION IN WILD RODENTS. J. Infect. Dis. 101(2): 148-153, 5 photos. Sept.-Oct. 1957.
Small rodents of Utah were inoculated with spores of Bacillus anthracinis. 80 spores were enough to cause death in all individuals tested of genera Peromyscus, Reithrodontomys, Neotoma, Perognathus, and Citellus. Dipodomys were resistant to as many as 40,000 spores. Eutamias and Onychomys were apparently intermediate, but tests on them were limited.

Menges, R. W., G. J. Love, Wm. W. Smith, and Lucille K. Georg. (US Pub. Health Serv., Atlanta, Ga.) RINGWORM IN WILD ANIMALS IN SOUTHWESTERN GEORGIA. Am. J. Vet. Res. 18(68): 672-677, 6 photos. July 1957.
Dermatophytes of 3 species were isolated by culture from hairs of 7.7% of 1,142 wild mammals of 21 species. The organisms were also cultured from soil samples.

Poole, John B. (McGill U., Montreal, Quebec.) ECHINOCOCCUS DISEASE IN NORTHERN NORTH AMERICA. Am. J. Tropical Med. & Hyg. 6(3): 424-429. May 1957.

Summary: "Surveys on the incidence of Echinococcus disease conducted on the native population in Northern North America reveal the role of wild animal reservoirs and show that sylvatic Echinococcus exists across the northern part of Canada and Alaska. The type of life cycle found in Alaska is compared to the Canadian type and some theories advanced to explain the differences. Finally, the wide-spread incidence of Echinococcus in the recently recorded endemic areas in the Northland suggests the possible spread of the disease to other parts of North America."

Trainer, Daniel O., Jr. (Wis. Cons. Dept.) WHAT ABOUT RABIES? Wis. Cons. Bul. 22(9): 15-18, 1 map. Sept. 1957.

General information about rabies and data on distribution and abundance of the disease in Wis. The state has had no major outbreaks recently; it has had only 2 cases in humans since 1941. Rabies in animals keeps occurring in several counties. Chief wildlife victim of rabies in Wis. is striped skunk, which has had 65% of known cases to date in 1957. Twice as many rabid animals were found in first half of 1957 as in all of 1956.

Wells, K. F. [RABIES IN CANADA.] Can. J. Pub. Health (June 1957): 239. 1957. [From J. Am. Vet. Med. Assn. 131(1).]

"Rabies has been officially reported in Canada in 32 of the last 47 years but, as in other world areas, the problem has changed. Not until recently has it threatened livestock. A disease, known to the Eskimos for over 50 years as 'wild fox disease' was diagnosed, in 1947, as rabies and, in 1952, it created a serious epizootic in the Northwest territories... Wildlife was reduced below the supposed threshold level for the spread of rabies (some doubt the effectiveness of this procedure). In Ontario, rabies was diagnosed in a fox late in 1954 and spread southward. Of 137 positive cases in Ontario in the year ending March 31, 1956, only 16.8 per cent were in dogs and 64.0 per cent in wildlife, mostly foxes. In the first four months of 1957, 85.2 per cent of all cases were in wildlife, and doubtless only a small portion of the cases were diagnosed."

SHREWS, MOLES, BATS

Hall, J. S., R. J. Cloutier, and D. R. Griffin. (U. Ill.) LONGEVITY RECORDS AND NOTES ON TOOTH WEAR OF BATS. J. Mamm. 38(3): 407-409. Aug. 1957.

Summary: "Longevity to 20.5 years in Myotis lucifugus and to 18.5 years in Myotis keenii has been established in New England. Survival to eight years is commonplace in Myotis lucifugus. Female Myotis lucifugus are capable of normal reproduction at an age of 9-12 years. Tooth wear in Myotis lucifugus and Myotis keenii is a highly unreliable criterion of age."

Hitchcock, Harold B. (Middlebury Coll., Middlebury, Vt.) THE USE OF BIRD BANDS ON BATS. J. Mamm. 38(3): 402-405, 1 fig. Aug. 1957.

Bird bands cause serious injury to many bats, sometimes to a large percentage. Better results are obtained if corners of bands are rounded off, or if band used not only has rounded corners but also has a small lip turned up at each end, as shown in fig. Ear tags might be even better.

Schneider, N. J., J. E. Scatterday, A. L. Lewis, Wm. L. Jennings, H. D. Venters, and A. V. Hardy. (Fla. Bd. Health, Jacksonville.) RABIES IN BATS IN FLORIDA. Am. J. Public Health 47(8): 983-989, 1 map. Aug. 1957.

5,503 bats of 12 species were studied. Rabies in bats was found in most parts of Fla. and in 7 of the 8 common species. Surprisingly, colonial species had lower rates of infection than free-living species: from 0.05% to 0.6% as compared to 0.6% to 2.6%. Of 35 abnormally behaving bats, 14% were positive for rabies. Of 12 bats that bit man, 4 were positive. Apparently all bat bites should be followed by Pasteur treatment unless bats prove negative. Negri bodies were evident in only 50% of infected bats. Largest proportion of positives was in summer. There was good evidence that some bats became infected very early in life. Available facts suggested that rabies is not brought into Fla. from south by migrating bats. General evidence suggested that bats spread rabies widely to wild and domestic animals.

Bronson, Franklin Herbert. THE ECOLOGY OF THE BLACK-TAILED JACKRABBIT (LEPUS CALIFORNICUS MELANOTIS, MEARNS) IN SOUTHWESTERN KANSAS. M.S. thesis, Kans. State Coll. 1957.

Study was made in sw. Kans., 1956-57. Av. litter size was 2.5 and av. number of litters per year was 2.8, so av. production per ♀ was 7.0. There was much prenatal mortality. Severe winter and failure of many females to become pregnant caused lower production than recorded in Calif. and Ariz. Suckling period was about 2 weeks. Age was estimated from reproductive organs and epiphyseal condition. Population indexes were obtained by walking lines and counting hares flushed. Drought and overgrazing caused failure of food supply; hares migrated to crop fields and severely damaged wheat and milo. Damage was local; it was much reduced by buffer fields. Records indicate that hare population has been relatively stable since late 1920s except during droughts of 1930s and 1950s. Data suggest that population stabilized during 1956 after rising since 1953. Apparently drought and overgrazing favor outbreaks, probably through effect of vegetational changes on juvenile survival, and perhaps on amount of reproduction.

Burns, Russell M. RABBITS PREFER SWEETGUM TO PINE. US For. Serv., S. For. Exp. Sta. (New Orleans, La.), S. For. Notes no. 111: 3-4. Sept. 1957.

Within 3 weeks after planting in n. Miss. uplands, 10% of gums, 4% of shortleaf pine, 1% of slash pine, and 0.5% of loblolly pine were damaged by rabbits. Damage varied from nipping of terminal buds to severing at groundline. Damage and preference varied with site. On one site, pine was preferred to gum. Volunteer seedlings on the sites were not harmed--only planted seedlings were nipped. Damage ceased in Mar. when herbaceous vegetation became available. Many seedlings sprouted after being damaged.

Dunnet, G. M. (Wildl. Surv. Sect., C.S.I.R.O., Canberra.) NOTES ON AVIAN PREDATION ON YOUNG RABBITS, ORYCTOLAGUS CUNICULUS (L.). C.S.I.R.O. Wildl. Res. 2(1): 66-68, 1 graph. July 1957.

Hawks and eagles took many rabbits near Canberra and often left the hind feet at plucking stations. Author correlated lengths of hind feet with weights of living young (graph). Correlation of weight with age was already known for the area, so ages of rabbits preyed upon could be determined. Main age-group taken was that of 30-40 days. "It is apparent then that the predators were consistently taking a particular and rather limited age-group of the population. It appears, too, that once the kittens reach an age of 3 months or so, they are no longer vulnerable to the three species of predators discussed."

Fenner, Frank. (Australian Natl. U., Canberra.) EVOLUTIONARY ASPECTS OF MYXOMATOSIS IN AUSTRALIA. Mem. Inst. Oswaldo Cruz 54(1): 271-278. 1956. [From Biol. Abs. 31(8).]

Haas, Glenn Edward. ECTOPARASITES OF THE MEARNS COTTONTAIL IN WISCONSIN. Ph.D. thesis, U. Wis. 129 p. 1957. [From abstract in Dissertation Abstracts 17(9).]

Lists 2 species of bots, 11 of fleas, 3 of ticks, and 1 of mite. Life history and certain other biological data are given for some of these species.

Hart, John Fraser. MYXOMATOSIS IN BRITAIN. Geog. Rev. 47(1): 126-128. Jan. 1957.

British farmers and foresters always considered the Eur. rabbit an unmitigated pest. Rabbit grazing fouls pastures, removes the better grasses, and leaves only valueless weeds; rabbit burrowing damages hedgerows, blocks drainage ditches, and undermines walls. Annual cost of fencing woodlands against rabbits ran over 2 million pounds a year. Annual cost of rabbit depredations was estimated at some 50 million pounds. Revenue from rabbit flesh and fur was only about 15 million pounds. The myxomatosis epizootic that began in Oct. 1953 had a mortality rate of 97.9 to 99.7%. There was hope that rabbits could be exterminated by supplemental means. Landholders in "rabbit clearance areas" were obligated to destroy the last rabbit; more than 2/3 of Britain was in such areas by late 1955. Crops were harvested in certain areas for the first time in recent history. Value of cereal crops increased 10-15%. Rate of cattle stocking was increased in some areas. Woodlands no longer needed fencing from

rabbits. Seedling trees rapidly occupied new ground. Grasslands changed from close-cropped turf to seas of waving grassheads. In all, extermination of rabbits might permit Britain to reduce food imports by 5-10%. Foxes, expected to turn to livestock and poultry, turned instead to rodents, insects, carrion, and vegetable matter. Foxes did, however, seem less vigorous and sporting when chased.

Johnson, Ancel Meringus. EFFECTS OF WEATHER CONDITIONS ON THE WINTER ACTIVITY OF MEARNS COTTONTAIL (SYLVILAGUS FLORIDANUS MEARNSI ALLEN) IN DECATUR COUNTY, IOWA. M.S. thesis, Iowa State Coll. 48 p. 1956. [Copy in US Dept. Int. Library.]

Success in live trapping was highest during or just after rising barometric pressure; it was below average as pressure fell. No correlation with other weather factors was found. Even barometric pressure could not be correlated with numbers of rabbits seen in line counts. There was, however, some correlation between snow and numbers of rabbits seen in line counts. Data are given on sex and age ratios, recaptures, distances traveled, weights, use of forms, cover types utilized, and estimated populations.

Mykytowycz, R. (Wildl. Surv. Sect., C.S.I.R.O., Canberra.) ECTOPARASITES OF THE WILD RABBIT, ORYCTOLAGUS CUNICULUS (L.), IN AUSTRALIA. C.S.I.R.O. Wildl. Res. 2(1): 63-65. July 1957.

List with indication of status on host and distribution in Australia.

Mykytowycz, R. (Wildl. Surv. Sect., C.S.I.R.O., Canberra.) THE TRANSMISSION OF MYXOMATOSIS BY SIMULIUM MELATUM WHARTON (DIPTERA: SIMULIIDAE). C.S.I.R.O. Wildl. Res. 2(1): 1-4. July 1957.

Black flies can be important vectors of this disease. Rabbits infected by S. melatum commonly have walnut-sized swellings on 1 or both ears.

Nakamura, Katsuya, and Hideaki Kondo. CONTROL OF THE HARE WITH SOME TRAP METHODS. 2. J. Japanese For. Soc. 39(2): 79-81. 1957. [From Biol. Abs. 31 (10).]

In Japanese. "From the results of experiments in 1954 and 1955, types and forms of traps and the effective season of trapping are discussed."--T. Satoo.

Perevalov, A. A. ON THE BIOLOGY OF REPRODUCTION OF THE DESERT HARE (LEPUS TIBETANUS). Zool. Zh. 35(1): 141-154. 1956. [From Biol. Abs. 31(10).]

In Russian.

Rowley, Ian. (Wildl. Surv. Sect., C.S.I.R.O., Canberra.) FIELD ENCLOSURE EXPERIMENTS ON THE TECHNIQUE OF POISONING THE RABBIT, ORYCTOLAGUS CUNICULUS (L.). I. A STUDY OF TOTAL DAILY TAKE OF BAIT DURING FREE-FEEDING. C.S.I.R.O. Wildl. Res. 2(1): 5-18, 6 figs. July 1957.

From summary: "Similar groups of individually marked and easily recognizable rabbits were established in the enclosures and their reactions to normal poisoning procedure (drawing the furrow, free-feeding, and poisoning) watched and recorded. The importance of the furrow is emphasized and an explanation offered. Consumption of free-feed appears to increase approximately twofold on successive nights once the rabbits start to eat the bait. The duration of this build-up varies with season and population and may be interrupted by weather or disturbance. In one instance only was the peak of free-feed consumption reached; all the rabbits were known to be feeding and the per capita nightly consumption was 1 lb 5 oz of carrot. After an interval of 7 weeks between successive free-feeds, the rabbits resumed eating carrot immediately and at nearly the same level as previously. This suggests that intermittent free-feeding, as practised in New Zealand, may be worth further investigation. The experiments were terminated with sodium fluoroacetate or strychnine. Both poisons achieved good kills, the former being more consistent."

Voris, John Calvin. FACTORS INFLUENCING THE SUMMER ROADSIDE COUNT OF THE COTTONTAIL RABBIT (SYLVILAGUS FLORIDANUS MEARNSI) IN SOUTH-CENTRAL IOWA. M.S. thesis, Iowa State Coll. 61 p. 1956. [Copy in US Dept. Int. Library.]

Wind was only climatic factor that could be correlated with rabbit counts. Rabbits were more often observed during calm. Best times of day for counts were the 2 hours after sunrise and the 2 hours before sunset. Peak number of observations fell in last 3 weeks of July in 2 years. Ratio of young to adults was so variable that interpretation of data on this topic was meaningless.

RODENTS--MISCELLANEOUS

Beer, James R., Charles F. MacLeod, and Louis D. Frenzel. (U. Minn.) PRENATAL SURVIVAL AND LOSS IN SOME CRICETID RODENTS. J. Mamm. 38(3): 392-402. Aug. 1957.

Summary: "A sample of 646 pregnant females from four representatives of the family Cricetidae were examined for rates of intrauterine loss of ova and embryos. It was only possible to estimate the loss for those females which did not suffer complete loss of litters. It was found that the potential litter size was smaller in small (young) females than in larger (older) females. There was also a considerably higher rate of total intrauterine loss in the small females. This loss varied from 9.0 to 22.5 per cent. The average litter size at birth was calculated to be 5.19 for Microtus pennsylvanicus, 6.10 for Clethrionomys gapperi, 5.33 for Peromyscus maniculatus gracilis and 4.51 for P. m. bairdii."

Durup, Henri. OBSERVATIONS SUR LE RYTHME DE L'ACTIVITÉ DU CAMPAGNOL DES CHAMPS (MICROTUS ARVALIS PALLAS). Mammalia 20(4): 390-404. Dec. 1956. [From J. Mamm. 38(3).]

Greenwald, Gilbert S. REPRODUCTION IN A COASTAL CALIFORNIA POPULATION OF THE FIELD MOUSE MICROTUS CALIFORNICUS. U. Calif. Publ. Zool. 54(7): 421-446, 11 figs. Apr. 1957. 50¢.

M. californicus may breed throughout year at San Francisco Bay. In 1952, a dry year when green vegetation was abundant for only a short period, major breeding occurred Feb.-May. In 1953, when vegetation was green for long period, major breeding was longer, Jan.-June. Females were sexually mature at 35 g. in 1952, at 30 g. in 1953. Males were fertile at 40 g. both years. An av. of 4.5 litters per ♀ was born in 1952, but 5.6 in 1953. Litters were smaller in 1953, however, so gross reproduction was about the same both years. Nevertheless, population was higher in 1953, probably because of better survival. During study, av. litter size was 4.2, range 1-9. Litter size varied seasonally, with peak in Apr. About 7% of embryos were resorbed. Some ♀♀ were pregnant at weight of 15 g. and age of about 2 weeks. Mice born early in season could breed in same season. Those born late in spring did not breed until fall or winter. Av. number of corpora lutea was 9.23. Some ♀♀ had up to 29 corpora lutea. Number of corpora lutea was poor guide to actual rate of ovulation. Placental scars vanished within 3 weeks. Sex ratio of embryos and new-born was 49.1% ♂♂. Sex ratio of trapped mice was 42.6% ♂♂ and varied seasonally. Reasons are discussed. The reproductive potential was never realized; Microtus is not as prolific as sometimes estimated. Data suggest that maximum life span of mice studied was 1 year.

Hansen, Richard M. (Colo. Agr. Exp. Sta., Ft. Collins.) DEVELOPMENT OF YOUNG VARYING LEMMINGS (DICROSTONYX). Arctic 10(2): 105-117, 4 figs. 1957.

Information from 13 litters is given on appearance of newly born, pelage changes, development of appendages, behavior of young, sexual maturity, growth, and comparisons with reported growth of other microtines.

Holdenried, R. (PHS Liaison Office, Ft. Detrick, Md.) NATURAL HISTORY OF THE BANNERTAIL KANGAROO RAT IN NEW MEXICO. J. Mamm. 38(3): 330-350, 7 figs. Aug. 1957.

Long, detailed paper on biology of Dipodomys spectabilis baileyi at Santa Fe. Discusses Dipodomys mounds and their plants and animals, populations, sex ratio, survival, reproduction, litter size, growth, dorsal gland, home ranges and travels, travels of ♀♀ after lactation, behavior when released, activity in relation to weather and light, and possible relation to plague maintenance and transmission.

Laffoday, Samuel Kanada. A STUDY OF PRENATAL AND POSTNATAL DEVELOPMENT IN THE OLDFIELD MOUSE, PEROMYSCUS POLIONOTUS. Ph.D. thesis, U. Fla. 133 p. 1957. [From abstract in Dissertation Abstracts 17(9).]

Development is described from time of insemination to near adulthood. Much information is given on developmental changes, but much is also given on reproduction. "In nonlactating females the gestation period was twenty-three to twenty-four days, but in lactating females it was twenty-five to thirty days. Post partum heat occurred within twenty-four hours after parturition and the average duration of the estrous cycle was about five days. The average size of

fifty-two litters was 3.35, while the average number of embryos in twenty-seven pregnant females was 3.55. The sex ratio of the litters was 50.78 per cent males and 49.22 per cent females... The vagina of females opened between twenty-nine and thirty-five days, and the post juvenile molt started at thirty-four to thirty-six days of age."

Lawrence, Wm. H. PORCUPINE CONTROL: A PROBLEM ANALYSIS. Weyerhaeuser Timber Co., For. Res. Notes. iii + 43 p., proc. July 1957. [Available from Weyerhaeuser Timber Co., For. Res. Center, Centralia, Wash.]

Useful document that is a review of information from the literature, colleagues, and personal experience. It is not solely on control. Lawrence gives a good review of damage done, significance of damage, habits, breeding, foods, habitat, seasonal movements, population density, predators, and other natural controls. He then discusses ecological control methods and control by hunting, poisoning, trapping, and fencing. He considers in detail the proper planning and organization of control programs, and mentions several research topics that deserve study. 28 references are cited.

Reynolds, Hudson G. (For. & Range Exp. Sta., Ft. Collins, Colo.) PORCUPINE BEHAVIOR IN THE DESERT-SHRUB TYPE OF ARIZONA. J. Mamm. 38(3): 418-419. Aug. 1957.

Rollins, H. A., Jr., and Frank Horsfall, Jr. MOUSE CONTROL WITH GROUND SPRAYS. V.P.I. Agr. Ext. Serv. (Blacksburg, Va.), Cir. 747. 3 p., 2 figs. Oct. 1957.

Directions for control of meadow and pine voles in orchards by heavy ground spray of endrin. Vegetation under trees is soaked by power sprayer. Best season is Oct. 15-Dec. 15. In 1 year, population may build up to 1/3 of original level. Spraying may not be needed every year. Endrin is extremely toxic both orally and dermally. As for rate of application, "Use the emulsifiable concentrate (1.6 pounds of actual endrin per gallon) at the rate of 3 pints per 100 gallons of spray. Use the 75% dry wettable powder at the rate of 4/5 of a pound per 100 gallons, or 4 pounds per 500 gallons, of spray for best results... When the endrin spray is applied with a boom to a strip 11 feet wide...1 gallon of spray is applied to each 6.7 feet of strip length." Damage to valuable wildlife is said to have been slight, with no more than an "occasional bird or rabbit found dead." Danger to fish, of course, is great. [Careful studies of wildlife effects should be made before this method is used. Extremely serious effects are to be anticipated, to judge from knowledge of endrin's toxicity and stability.]

Swena, Richard, and Laurence M. Ashley. OSTEOLOGY OF THE COMMON PORCUPINE ERETHIZON DORSATUM. Publ. Dept. Biol. Sci. & Biol. Sta., Walla Walla Coll., 18: 1-26. Dec. 1956. [From J. Mamm. 38(3).]

Syroechkovskii, E. E. A METHOD OF ESTIMATING THE ABUNDANCE OF THE GREAT VOLE IN RELATION TO PECULIARITIES OF THEIR DISTRIBUTION IN SANDY DESERTS. Biull. Moskovskovo Obshchestva Ispytatelei Prirody. Biol. 61(1): 78-81. 1956. [From Biol. Abs. 31(9).]

In Russian.

Tupikova, I. V., and IU. G. Shvetsov. REPRODUCTION OF WATER VOLES IN THE VOLGO-AKHTUBIN RIVER VALLEY. Zool. Zh. 35(1): 130-140. 1956. [From Biol. Abs. 31(10).]

In Russian.

Wilusz, Zdzislaw. UNTERSUCHUNGEN ÜBER DIE WANDERUNG MICROTUS ARVALIS PALL. Ekologia Polska, Ser. A. 4(11): 333-348, 2 figs. 1956 (1957). [Copy in US Dept. Interior Library.]

In Polish with German summary.

RATTUS AND MUS

Childs, John A. (City Health Dept., Balt., Md.) HOW WE'RE CONTROLLING RATS IN BALTIMORE. Pest Control 25(8): 9-10, 12, 48, 2 photos. Aug. 1957.
Tells about techniques and administration of program by which Baltimore is fighting rodent problems by cleaning up residential environments, overhauling industrial premises, poisoning, and controlling ectoparasites.

Gates, Robert L. (Food Machinery & Chem. Corp., Middleport, N. Y.) DIPHACIN, NEW ANTICOAGULANT RODENTICIDE. Pest Control 25(8): 14, 16. Aug. 1957.
The new rodenticide, diphacinone, will be commercially available in fall of 1957. Baits will contain 50 ppm. or 0.005%. Diphacinone is described as the most active anticoagulant per unit weight proposed for rodenticide work. Acceptance by rats is good. Individual rats apparently cannot develop tolerance to it. It is effective against both rats and mice. Field and laboratory tests have demonstrated its utility. It is relatively safe: acute oral toxicity, LD_{50}, is 5 to 15 mg./kg. for cats and dogs and over 150 mg./kg. for swine. At 5 mg./kg., an animal would have to eat 1/10 of its body weight of bait containing 50 ppm. of diphacinone to be endangered by one meal.

Iushchenko, G. V. PSEUDOTUBERCULOSIS IN RODENTS INHABITING LARGE CITIES. J. Microbiol., Epidemiol. & Immunobiol. 28: 117-121. 1957. [From long author's abstract in Pub. Health Eng. Abs. 37(10).]
The disease was found in many city rodents, especially in outskirts of cities. It was also found in rodents of fields and woods. House mice were most susceptible. The disease is transmissable to people. Data are given on laboratory studies of the organism, and on relative susceptibility of various rodents.

Kartman, Leo, and Richard P. Lonergan. WILD-RODENT-FLEA CONTROL IN RURAL AREAS OF AN ENZOOTIC PLAGUE REGION IN HAWAII. Bul. World Health Org. 13: 27-48, 6 figs. 1955. [From abstract in Pub. Health Eng. Abs. 37(9).]
Flea-control methods were tested. "Among several designs, a metal hood-type DDT bait-box was developed which was simple in design, low in cost, easy to transport to and maintain in the field, protected the insecticide from the elements, and attracted all species of field rats inhabiting a gulch... These rats...readily fed in the DDT bait-boxes and were dusted with 10% DDT powder (in pyrophyllite) on contacting hanging cloth sacks, containing the insecticide, when entering and leaving the bait-boxes. The results indicate that a reduction of the plague-vector fleas...may be obtained both on rats and within their burrows and nests, by the use of DDT-bait-boxes." The method may be valuable in preventing plague epizootics.

Mohr, Carl O., and Wm. W. Smith. (Ill. Nat. Hist. Surv., Urbana.) ERADICATION OF MURINE TYPHUS FEVER IN A RURAL AREA. Bul. World Health Org. 16: 255-266, 1 graph. 1957.
Synopsis: "An attempt to eradicate murine typhus fever by control of rats and rat-fleas in rural foci was carried out in Georgia between July 1953 and May 1954. Anticoagulant rat poisons and DDT powder were the principal agents used. Rats were eliminated from 89% of rat-infested premises and satisfactory flea reduction was achieved. Although the premises cleared of rats have become reinfested at a rate of 25% 10-18 months after clearance, typhus fever has apparently been eliminated. On the results reported, the authors believe that eradication of murine typhus fever from rural areas is economically and practically feasible, and that plague in commensal rats may also be eliminated by measures similar to those adopted in this experiment."

Smith, Wm. W. (US Pub. Health Serv., Atlanta, Ga.) POPULATIONS OF THE MOST ABUNDANT ECTOPARASITES AS RELATED TO PREVALENCE OF TYPHUS ANTIBODIES OF FARM RATS IN AN ENDEMIC MURINE TYPHUS REGION. Am. J. Tropical Med. & Hyg. 6(3): 581-589, 7 figs. May 1957.

U. S. Public Health Service. (50 7th St. NE., Atlanta, Ga.) PRINCIPLES OF RAT AND MOUSE CONTROL. Pest Control 25(8): 18, 20-21, 24, 26, 29, 3 figs. Aug. 1957.
A guide to operations. It discusses diseases carried by rats and mice, signs of presence, instructions for use of various poisons, formulation of poison baits, characteristics of common rodenticides, control of ectoparasites.

SCIURIDS

Beckwith, Stephen L. (U. Fla.) PURPLE SQUIRRELS. Fla. Wildl. 11(5): 18-19, 41, 2 photos. Oct. 1957.

Popular, preliminary report on studies of gray squirrels at Gainesville. These animals were pursued by more hunters, took more hunting pressure, and supplied more pounds of game meat than any other species in Fla. An acorn-preference test demonstrated that gray squirrels liked acorns of live oak and blue-jack oak. Second preference was for acorns of turkey, red, swamp chestnut, Shumard, and laurel oaks. Least liked were acorns of water oak. Some individual squirrels homed from distances of from 1/3 mi. to nearly 5 mi. Most individuals failed to home 1 mi. Home range probably is no more than 50 yds. in radius. Drinking water was found to be important to squirrels.

Branch of Predator & Rodent Control. GROUND SQUIRRELS AND THEIR CONTROL. US F&WS, Wildl. Leafl. 356. 2 p. May 1957.

Gives generalized review of habits, tells how to prepare and use strychnine bait, and how to fumigate burrows with calcium cyanide or automobile exhaust.

Carson, Jim. (W. Va. Cons. Comm.) SQUIRRELS! ARE THEY INVINCIBLE? W. Va. Cons. 21(7): 11-13, 3 photos. Sept. 1957.

Gray squirrels of a 29-acre wood lot in Roane Co., W. Va. were live-trapped and tagged before and after hunting seasons of 1955 and 1956. In 1955 about 28 squirrels were present. They were hunted by 24 men for total of 58 hours, or about 2 hours hunting per acre. Only 9 squirrels (32%) were shot. Mast conditions were favorable and before 1956 hunting season there were about 45 squirrels--an increase of 60%. Twenty-one men hunted 43 hours and shot 14 squirrels, or 31%. This and other evidence indicate that squirrels become exceedingly wary under hunting and that overshooting is most unlikely. Squirrels may be a resource we don't have to worry about IF we provide suitable habitat and time hunting seasons so as not to kill too many nursing and pregnant females.

Denniston, Rollin H., II. (U. Wyo., Laramie.) NOTES ON BREEDING AND SIZE OF YOUNG IN THE RICHARDSON GROUND SQUIRREL. J. Mamm. 38(3): 414-416. Aug. 1957.

Kirkpatrick, Charles M., and Edward M. Barnett. (Purdue U.) AGE CRITERIA IN MALE GRAY SQUIRRELS. J. Wildl. Mgt. 21(3): 341-347, 2 figs. July 1957.

Based upon 108 male gray squirrels collected during all months; reports a search for skeletal age criteria. Av. skeletal dimensions and observations on the cartilage plate are correlated with ages of squirrels as determined by reproductive histology. With one exception, the mean adult skeletal measurements exceed those of juveniles, and generally the former are greater. The overlap of individual measurements between the 2 age groups is extensive; hence age prediction from single measurements of skeletal parts is limited at best, except perhaps in case of the baculum. The baculum is described and the use of it as an age criterion is discussed. An analysis of baculum weights shows that a reliable separation point exists between juveniles and adults. Baculum lengths are slightly less accurate for aging. A cruder but more expedient method of aging squirrels is offered by the cartilage plate between the epiphysis and diaphysis of leg bones. Investigators, using this method can age about 90% of the squirrels, since 89% of unossified bones are from juveniles and 92% of ossified bones are from adults.--C. M. Kirkpatrick.

Luckmann, Wm. H. (Ill. Nat. Hist. Surv., Urbana.) CONTROL OF GROUND SQUIRRELS WITH GROUND SPRAYS OF DIELDRIN. Agron. J. 49(2): 107. 1957. [From Biol. Abs. 31(9).]

Moore, Joseph Curtis. (Am. Mus. Nat. Hist., N. Y. 24.) THE NATURAL HISTORY OF THE FOX SQUIRREL, SCIURUS NIGER SHERMANI. Bul. Am. Mus. Nat. Hist. 113(1): 1-71, 3 pl., 7 figs. Aug. 1957. $1.50, paper.

Comprehensive study of biology of the rare n. Fla. fox squirrel in and near U. Fla. Cons. Reserve, Putnam Co. Gives much information on potential predators, parasites, behavior and feeding of captives, reactions to weather, seasonal activities, physical activities, social relationships, reproduction and growth, types of nests, nest sites, and population density. This squirrel became rare with lumbering of old longleaf-pine stands and is now largely dependent on turkey oak. Trends in land use are not favorable. In other words, this squirrel

is adapted to a habitat that is nearly gone and is hanging on in a second-rate habitat that is being reduced. It is exceptionally vulnerable to hunting today. Shooting should stop when oak leaves drop. Individuals will take refuge in Gopherus burrows and a few nest underground in stumps. Activity is greatest 2-4 hours after sunrise. Activity of squirrels should be reported with reference to sunrise and sunset rather than to standard time. A limited amount of territoriality was observed. Litters av. 2.27. There are winter and summer breeding periods, probably in correlation with seasonal food supplies. Adults molt once a year, in almost any month, but with peak in summer. Several types of nests are used for special purposes. Adult ?? keep about 8 functional leaf nests apiece in areas of 100-150 meters in diameter. Population density in a relatively favorable area was about 1 adult ? per 13 acres, or about 1 squirrel older than nestlings to each 6.5 acres.

Poliakov, I. Ia, and T. S. Gladkina. A MECHANIZED METHOD FOR THE EXTERMINATION OF SUSLIKS. Zemledelie 1955(6): 103-107. 1955. [From Biol. Abs. 31(9); Referat. Zhur., Biol. 1956, No. 19131.]

In Russian. "A bait was prepared consisting of oats mixed with 15% of zinc phosphate and 4.5% of lubricating oil. This bait was spread with the aid of an auto-spreader at the rate of 700 g per hectare, the cost amounting to 1-2 roubles per hectare. The marmot casualties were 90-98%. For a field strip 120 m wide, the poisoned grain was mixed with loam or with clay and was spread as described above. 2-3 hrs. after spreading the clay or loam cover cracks open and bait becomes visible and accessible to the susliks marmots."

Schultz, Vincent. (U. Md., College Park.) STATUS OF THE GRAY AND FOX SQUIRRELS IN TENNESSEE. J. Tenn. Acad. Sci. 32(3): 228-239, 2 maps. July 1957.

Reviews published knowledge of taxonomy and distribution of Sciurus in Tenn., reports data on occurrence of both species as determined by state-wide interview-survey of heads of farm households, and presents hunting statistics for 1950-51. Gray squirrels are common throughout Tenn. where habitat exists. Fox squirrels also occur throughout Tenn. but are commoner in western than eastern half of state. Squirrels are the most sought game in Tenn., but rabbits are nearly as popular.

Uhlig, Hans G. (US Soil Cons. Serv., Fergus Falls, Minn.) GRAY SQUIRREL POPULATIONS IN EXTENSIVE FORESTED AREAS OF WEST VIRGINIA. J. Wildl. Mgt. 21(3): 335-341, 4 graphs. July 1957.

14,543 squirrels were sexed and aged over a period of 6 years on 4 areas ranging from 6,000 to 12,000 acres. Annual fluctuations in population density appeared to depend primarily upon the number of juveniles in the autumn population--not upon survival of adults. There was a distinct parallel in trend between the juvenile population density and mortality during the following year. Changes in sex ratios of adults did not appear to be associated with changes in population density. The juvenile sex ratio usually was in favor of males when lower than av. populations occurred.--Author.

Zimny, Marilyn L., and Victor Tyrone. (La. State U. Sch. Med., New Orleans.) CARBOHYDRATE METABOLISM DURING FASTING AND HIBERNATION IN THE GROUND SQUIRREL. Am. J. Physiol. 189(2): 297-300. 1957. [From Biol. Abs. 31(9).]

See Biol. Abs. for authors' abstract.

BEAVER

Allen, Ken. (Ohio Dept. Nat. Resources.) BUCKEYE BEAVERS. Ohio Cons. Bul. 21(9): 8-9, 22 illus. Sept. 1957.

Beavers were extirpated in Ohio by 1830. No more were seen until 1936. Since then invasion from Pa., Mich., and Ky. has taken effect and so has restocking. There are now some 154 colonies in Ohio, chiefly in ne., s., and nw. Map shows counties that have colonies or in which stocking has been done. The bulk of this paper is a popular review of beaver life history.

BEAVER--Continued

Wick, Wm. Q., and Harte E. Penttila. (Wash. Dept. Game, Mt. Vernon.) BEAVER LITTER OF SEVEN FROM SKAGIT COUNTY, WASHINGTON. Murrelet 38(1): 7. Jan.-Apr. [Aug.] 1957.

Litter of 5 is rare in area; av. is 3. Includes note on development of the fetuses, which were about 3 weeks from birth.

MUSKRAT AND NUTRIA

Anon. NUTRIA, POOR MAN'S MINK. Farm Quarterly 12(3): 56-57, 70, 72, 74, 2 photos. Autumn 1957.

In addition to reviewing much well-known information about nutria and warning gently about the breeding stock racket, this article tells how certain nutria growers handle their animals, what their costs are, and what their hopes are for their pastel strains. [It should be noted that these growers are still selling breeding stock at excellent prices. It is to be doubted that their hope of seeing a nutria coat on every stenographer will materialize. Processing and fabricating costs make the prospect most unlikely. Even coats made from low-cost pelts of wild nutria cost hundreds of dollars. And prices for the finest of pastel nutria pelts can never approach prices now being obtained for breeding stock. One cannot say that growing mutation nutria for pelts will never be a success, but the extremely poor market for good pelts of wild nutria does not speak well for the future of the business. Furthermore, failing fur farmers not uncommonly release their animals, and one thing we do not need in this country is more colonies of feral nutria to injure or destroy crops of farmers, the work of engineers, and the habitat of wildlife.]

Draney, Virgil. (Utah Dept. Game.) THE CONTROVERSIAL NUTRIA. Utah Fish & Game Mag. 13(7): 6-9. July 1957.

Facts and figures from the Better Business Bureau and other sources are quoted at length to show how unlikely profits are from rearing nutria. Much of the nutria promotion is utterly misleading. Nutria pelts are in little demand and bring only small prices. There is slight prospect of change in this situation. Disappointed breeders may release their stock. "Due to these releases, and to nutria escaping from other pens, it appears the nutria is becoming established in the Utah marsh lands. A number of complaints have been received by the Department of Fish and Game that nutria have destroyed gardens and crops and otherwise have created a nuisance problem. Because of these problems and because of a complete lack of trapper interest the 1957 legislature removed the nutria from the protected furbearer list. This action places the nutria in its proper classification of rodent, and potentially dangerous nuisance." The U. S. Fish and Wildlife Service is launching nutria-control programs because of the damage these animals do to waterfowl habitat.

Page, C. A., Van T. Harris, and JoAnn Durand. (SW. La. Inst., Lafayette.) A SURVEY OF VIRUS IN NUTRIA. SW. La. J. 1(3): 207-210. July 1957.

A survey was undertaken to determine if feral nutria were virus reservoirs. Thirty nutria were shot at Belle Isle, Vermilion Parish, La. Each was autopsied. Heart, liver, lung, spleen, brain, and lymph node tissues were removed and prepared for inoculation into mice and chicken eggs. Initial embryo passage indicated a low-level virus activity in all types of tissues. Activity ranged from 2.3% of animals investigated for lymph node to 10.9% for heart. Subsequent embryo passage of allantoic fluid from dead embryos showed no virus activity. There were no deaths of inoculated mice, but there was a high incidence of liver, brain, and lung inflammation. Liver preparations from mice originally inoculated with liver extract produced 22% mortality of embryonating chicken eggs on 1st passage. Since all nutria studied appeared healthy, the biological activity demonstrated is attributed to a virus latent in nutria.--Authors.

Section of Wild Fur Animal Investigations. NUTRIAS IN THE UNITED STATES. US F&WS, Wildl. Leafl. 389. 11 p. June 1957.

Modernized version of WL 319, which was written by F. G. Ashbrook, 1949. It discusses introductions and escapes, history of pen-rearing ventures, range extensions in U. S., characteristics, foods, habits, reproduction, trapping and preparing pelts, and current market for nutria pelts. 25 references, many of them recent, are cited. A few salient points may be mentioned. Practically

all efforts to pen-rear nutria for fur have failed both here and abroad. The few pelts reaching market from U. S. nutria farms in 1957 were far from uniform and were not superior in any outstanding way to the regular run of good pelts from wild nutria. During 1955-56 season, the best pelts of nutria trapped in La. brought $2.50, but av. was $1.00. Many pelts had no commercial value. Trappers in La. took 418,772 nutria for pelts in 1955-56, but many nutrias were discarded in the field and many others were killed to protect rice fields. Nutrias cause severe damage wherever rice, corn, sweet potatoes, and other agricultural crops are grown close to waterways. These animals compete directly with waterfowl and muskrats for food in marshes. Methods for controlling nutrias on wildlife refuges are being sought.

FUR ANIMALS, GENERAL

Collier, Eric. (Riske Creek, B. C.) REVOLUTIONARY NEW TRAP. Outdoor Life 120(4): 70-73, 80, 82, 13 photos. Oct. 1957.

"...the hopeless years of searching for a better trap are past. The fur trade is no longer shackled to the gin trap that for three centuries was its only reliable tool." The author, a veteran trapper, gave long and rigorous field tests to the new, light traps developed by Frank Conibear with financial assistance of the Assn. for Protection of Fur-Bearing Animals. The traps killed in an instant, did not damage pelts, did not take waterfowl, worked in water or on land, were as light as leg-hold traps, and came in sizes suitable for animals from weasel to beaver. "We know the humane trap is amazingly efficient on beaver, muskrat, mink, marten, fisher, white fox, weasel, squirrel, lynx, raccoon, skunk, and bobcat." These traps are expected to cost no more than leg-holds, once they are in volume production. "I predict that trappers will gradually switch to the humane trap without pleas from pressure groups or threats of law--simply because they can make a better living with the Conibear trap." "The Conibear traps...have jaws formed by two square frames of spring-steel rod. Pivots join these two frames in the center at top and bottom, and the frames swing open scissor-like. A powerful spring (two springs on some models) is compressed as the trap's double jaws are opened. A trigger bar of steel wire, held in position by spring tension, keeps the cocked jaws open." An animal touches the trigger bar, the jaws of the trap snap together across its body, and the animal is killed like a mouse in a snap-trap. Types of sets needed apparently are quite feasible and readily used by trappers accustomed to the old traps.

Edwards, R. Y., and I. McT. Cowan. (B. C. For. Serv., Victoria.) FUR PRODUCTION OF THE BOREAL FOREST REGION OF BRITISH COLUMBIA. J. Wildl. Mgt. 21(3): 257-267, 2 figs. July 1957.

The boreal forest of n. B. C. is divisible into 7 ecological subregions. Data from annual reports of white trappers are used to calculate the av. annual production of fur in these subregions. Figures are given in terms of numbers of sq. mi. required to produce one pelt. Years involved are 1929-48. Data are reported for 13 species: beaver, muskrat, red squirrel, marten, fisher, mink, otter, wolverine, weasel (Mustela sp.), lynx, red fox, coyote, and wolf. For some species it is possible to offer ecological explanations for marked differences in production among the subregions. Also, furbearers fall into two groups, those with fine fur, and those with coarse fur. Factors influencing production of these 2 groups are quite different. Fine fur tends to be taken in proportion to size of furbearer population concerned; production of coarse fur is the result of several factors that influence intensity of trapping effort. A major conclusion is that careful management is less important for species with coarse fur than it is for species with fine fur. The latter are usually present in lower densities, and have proven more vulnerable to reduction by human influences.--R. Y. Edwards.

Links, J. G. THE BOOK OF FUR. James Barrie, London. 185 p. 1956. 25s. [From review by M. B., The Beaver, Spring 1957.]

Readable, popular book by man whose life has been spent in fur business. Chief purpose of book is to explain to buyer of fur garments the relationship between price and quality. "The Book of Fur covers a wide field. It ranges

from the trapper to the wearer, with interesting accounts of the work of the many skilled people involved in the production of one fine coat. It touches briefly on the history of furs and their part in costume. There is a capsule history of the Hudson's Bay Company; a section on furs in general; and about half the book is devoted to specific furs, from rabbit to mink. The latter receives most attention in the book, being today's most popular fur..."

BEARS

Grove, Alvin R. (Pa. State U., U. Park.) BEAR FACTS. Pa. Game News 28(11): 7-13, 5 photos. Nov. 1957.

Popular compilation of scientific information about black bears in ne. U. S. Gives data on weights, size of young, frequency of litters, size of litters, age at first breeding, season of breeding, color phases, den sites, winter sleep, foods, travels, sizes of individual ranges, routes repeatedly used by different bears, and general habits.

Zeedyk, Wm. D. (NE. For. Exp. Sta., Upper Darby, Pa.) WHY DO BEARS GIRDLE BALSAM FIR IN MAINE? J. For. 55(10): 731-732. Oct. 1957.

"Bear girdling that causes injury or death of pole and sawtimber trees was found to be common throughout the northern portions of Aroostook, Piscataquis, and Somerset counties. Such injuries were not observed in the coastal region... Pockets of dead firs sometimes exceed an acre in size and may reflect...injuries sustained over one or more seasons... The bark is pulled up, out, and away from the base of the tree either by biting or clawing. Usually some remains attached and dangling in long strips... There is no evidence that any bark or wood is actually eaten: the bears probably only lick the sap and gum from the inner bark... A bear's taste seems to run especially to balsam fir. Spruces are attacked much less. Only an occasional cedar is injured..."

RACCOON, RINGTAIL, COATI

Johnson, John Irwin. STUDIES OF VISUAL DISCRIMINATION BY RACCOONS. Ph.D. thesis, Purdue U. 111 p. 1957. [From abstract in Dissertation Abstracts 17 (7).]

Results of various experiments are described. Raccoons displayed good visual discrimination. "Their learning set formation was superior to that reported for any subhuman species except higher monkeys and chimpanzees."

Robinson, V. B., J. W. Newberne, and D. M. Brooks. (Pitman-Moore Co., Indianapolis 6, Ind.) DISTEMPER IN THE AMERICAN RACCOON (PROCYON LOTOR). J. Am. Vet. Med. Assn. 131(6): 276-278, 1 map. Sept. 15, 1957.

Summary: "An epizootic disease occurred in raccoons in northwestern Indiana in 1955. During 1956, the disease, in less than epizootic proportions, was reported in 54 of 92 counties. Laboratory examination of ill or dead raccoons from 18 counties resulted in a histological diagnosis of distemper in 24 of 32 (75%). A variety of miscellaneous diseases accounted for the remaining 8 (25%). The results of experimental transmission and cross-protection tests, using both previously vaccinated and susceptible raccoons, ferrets, and dogs, indicate that the agent of raccoon distemper isolated in this study and that of canine distemper are antigenically identical. Muskrats were refractive to infection with distemper virus."

MUSTELIDS

de Vos, Antoon. (Ont. Agr. Coll., Guelph.) PREGNANCY AND PARASITES OF MARTEN. J. Mamm. 38(3): 412. Aug. 1957.

Observations on 2 pregnant Martes americana from Ont. One carried the fleas Monopsyllus vison and Megabothris atrox.

Greer, Kenneth R. (Mont. Game Dept., Bozeman.) SOME OSTEOLOGICAL CHARACTERS OF KNOWN-AGE RANCH MINKS. J. Mamm. 38(3): 319-330, 2 pl. Aug. 1957.

Skeletons of 883 mink of known ages were studied for age differences. Conformation of baculum permitted recognition of practically all ♂♂ as young or adult. Size of suprasesamoid tubercle of femur gave 92.8% separation for both sexes; it was absent or small in young, medium or large in adults. Presence of jugal suture in juvenile and its absence in adults separated 93.4% of specimens. Characters of pubic symphysis and edge of ischium were of some value in aging. By using both suprasesamoid tubercle and jugal suture (as shown in chart), 95.5% of specimens could be aged correctly. Data are given on other characters studied and on importance of considering both sides of an individual, i. e., both femora, both jugals.

Hibbard, Edmund A. (N. Dak. Game Dept., Windsor.) AGE RATIOS IN WILD MINK POPULATIONS. J. Mamm. 38(3): 412-413. Aug. 1957.

Age ratios were determined from large series of bacula from commercially trapped mink. Ratios of young to adults from 4 areas in 1954 were 3.58, 3.98, 4.27, and 4.57 to 1. In 1955, ratios were 4.71, 4.84, 5.15, and 5.55 to 1. Higher ratios in 1955 may represent poor trapping weather, lighter trapping pressure, and a proportionately larger catch of naive young. This should mean higher survival of all age groups.

Hume, Charles. SKUNKS AS PETS. All-Pets Books, P. O. Box 151, Fond du Lac, Wis. 40 p., 10 photos. 1957. 75¢. [From Outdoor News Bul. 11(17).]

The rather large number of requests from the public for information on keeping skunks makes this booklet worthy of mention. It is said to be "a complete account of skunk keeping, including different species of skunks, diet and feeding, training, housing, the defense mechanism, hibernation, health data, and breeding."

DOGS, WOLVES, FOXES

Gier, H. T. (Agr. Exp. Sta., Manhattan, Kans.) COYOTES IN KANSAS. Kans. Agr. Exp. Sta., Manhattan, Bul. 393. 1-97 p., 32 figs. Aug. 1957.

Important research report based on 1,725 specimens and years of work. Subjects given major attention are: food habits, economic losses caused by coyotes, benefits from coyotes, reproduction, weights, hybrids, numbers, population trends, effect of food-supply and other factors on production, and control methods. Parasites, diseases, and reproduction have been or will be treated more fully elsewhere. Chief food (Oct.-May) was rabbit, followed by carrion, chicken, and rodents. Birds, fruits, and insects were minor foods. Apparently coyotes eat the most readily available meat but prefer rabbits and field mice. Coyote damage in Kans. was about $1,350,000 in 1949. Chief damage was to chickens, calves, and sheep. Poultry and livestock losses appeared to be roughly inversely proportionate to availability of rabbits and rodents. Benefits from coyotes would be greater than losses except for individual "killers." When rabbits and rodents were plentiful, about 60% of ♀♀ bred and had litters av. 6 or more. When rabbits and rodents were scarce, as few as 30% of ♀♀ bred and had litters of about 4. Mature ♂ coyotes av. 30 lbs., ♀♀ 26 lbs. Young were as large as adults by Dec. Of coyotes killed in winter, 47% were young, 30% were 2 years old, 16% were 3 years old, and 7% were 4 or more years old. Population estimates (based on bounty data), fluctuations, and population dynamics are discussed. Coyote population of Kans. av. 21,000 breeders, rises to 60,000 at end of whelping season, with av. of 1 litter per 16 sq. mi. Breeding success is more important than number of breeders. Need of control is greatest when coyotes exceed food supply. Control should emphasize extension trapper system as well as sport hunting and other forms of individual control. Data should be gathered regularly on coyote and rodent populations to determine times of excess coyotes. At such times, den hunting should be encouraged. Present low bounty should be continued for time being to get population data and encourage den hunting.

Lundgren, D. L., N. J. Marchette, and K. L. Smart. (Ecol. Res., U. Utah, Dugway.) TULAREMIA IN THE COYOTE, CANIS LATRANS LESTES MERRIAM. J. Infect. Dis. 101(2): 154-157. Sept.-Oct. 1957.

Adult coyotes could not be infected with virulent strain of Pasteurella tularensis. The organism was recovered from blood of 1 exposed individual, and from feces of another 6 and 24 hours after it had eaten an infected guinea pig. "Adult coyotes were shown to be less susceptible to tularemia infection than are immature coyotes and other carnivores reported in the literature."

McEwen, Eoin H., and Alexander Scott. (U. Aberdeen, Scotland.) PIGMENTED AREAS IN THE UTERUS OF THE ARCTIC FOX ALOPEX LAGOPUS INNUITUS MERRIAM. Proc. Zool. Soc. London 128(3): 347-348 + 1 pl. June 1957.

Summary: "Dark macroscopic pigmented areas were present in the uterus of the Arctic Fox. The pigment was intracellular and granular, and was concentrated in the basal layer of the endometrium. It was found to consist of haemosiderin together with a lipid component. The pigmented areas, former placental sites, remained in some cases up to ten months after parturition. It is suggested that the number of pigmented areas gives a measure of the number of implantations present during the previous season."

Murie, Olaus J. (Moose, Wyo.) WOLF. Aud. Mag. 59(5): 218-221, 3 figs. Sept.-Oct. 1957.

Popular article against wolf control for protection of game. Examples are cited to show that wolves tend to take sick and injured game animals, that wolves do not exterminate game herds, that the real limiting factors for caribou and other game animals are space and food supplies, that these factors may completely extirpate a game population where there are no significant predators, and that wolves have interest and value in themselves. Murie feels that the public is slowly shifting to a broader and more ecological view of wildlife matters, and that predator-control officials are still laboring under outmoded preconceptions.

Sampson, Frank. (Mo. Cons. Comm.) THE PERENNIAL FOXES. Mo. Cons. 18(9): 1-3, 4 photos. Sept. 1957.

Semipopular discussion of population trends of red and gray foxes in Mo., estimated numbers on certain areas, annual turnover of foxes, food habits in relation to availability, lack of effect on game populations, and desirability of controlling livestock-eating foxes through extension trapper system. The food-habits data apparently are from Korschgen's study, which is reviewed on p. 17 of this issue of WR.

Swink, F. Nelson, Jr. (Va. Comm. Game.) RED FOXES--FACTS AND FANCIES. Va. Wildl. 18(8): 5-7, 22, 5 photos. Aug. 1957.

Popular article with some good original and compiled information. It discusses possible origin of e. red foxes from British introductions, numbers in various areas, breeding, litter size, food habits, economic importance, and need of reduction for rabies control. At present, red foxes in Va. are declining because of a severe epizootic of sarcoptic mange. Grays outnumber reds in Va. by 10 to 1, and by even more in many parts of state. Expenditures for fox hunting probably run over $100 million a year in the U. S., but the sporting potential of foxes still is not fully exploited.

CATS

Doll, A. D., D. S. Balser, and R. F. Wendt. (Wis. Cons. Dept.) RECENT RECORDS OF CANADA LYNX IN WISCONSIN. J. Mamm. 38(3): 414. Aug. 1957.

BIG GAME, GENERAL

Beeman, Robert D. (U. Idaho.) BIG GAME SALTING IN IDAHO. Idaho Wildl. Rev. 10(2): 3-5, 3 photos. Sept.-Oct. 1957.

Idaho has been a leader in establishing salt stations. In the main, summer ranges have been salted in an effort to lure game away from inadequate winter ranges for as much of year as possible. Does this work? Studies to find out

are under way. So far, little if any effect of salt on migrations has been observed. Animals use salt stations intensively, even eating soil from which all trace of salt has vanished. An artificial lick usually remains active for 2 years after a salting, so a lick need not be renewed annually. Greatest use of salt is in spring, but there is a secondary peak in midwinter.

Delap, Peter. SOME NOTES ON THE SOCIAL HABITS OF THE BRITISH DEER. Proc. Zool. Soc. London 128(4): 608-612, 2 graphs. July 1957.

Among red deer, there is no territoriality, fairly large groups of ♀♀ and young are common, and ♂♂ tend to be solitary. Groups of ♀♀ and young tend to keep within the nuclear area of a colony, while stags gravitate to the periphery except during rut. The groups of ♀♀ and young like open areas and seek safety in prolonged flight; stags are slower, like woods, and seek safety by short dashes into heavy cover. Roe deer, on the other hand, are a smaller, woods-dwelling species. Both sexes are strongly territorial. Roe deer seldom form groups, except loose groups in winter when cover is scarce. These deer travel little, have relatively small territories (minimum perhaps 100 acres). Yearlings are driven from parental territories and have to find new ones by dangerous wandering into unknown areas.

Durrell, W. B., and W. D. Bolton. (U. Vt., Burlington.) PARASITOSIS IN A MUSK OX. J. Am. Vet. Med. Assn. 131(4): 195-196, 1 photo. Aug. 15, 1957.

Summary: "Stomach worms, tapeworms, and lungworms were found in a musk ox. Stomach worm disease (haemonchosis) caused the death of the animal." The musk ox was a captive in Vt. but is thought to have brought the parasites from its native range in District of Mackenzie, Can.

Edwards, R. Y. (B. C. For. Serv., Victoria.) DAMMED WATERS IN A MOOSE RANGE. Murrelet 38(1): 1-3. Jan.-Apr. [Aug.] 1957.

A chain of lakes was deeply flooded by hydro-electric development of a tributary of the Fraser R. in B. C. Floating woody debris along shores made a dense barrier through which moose cannot swim. This barrier will persist for decades. Many moose drowned in the initial flooding. Flooding and debris blocked migration routes, thus causing many more moose to drown. Worse, however is flooding of valuable winter range and blocking of migration route to winter range that still exists. Full effect on moose will not be seen for some years, but local signs of food shortage are already appearing. "...the region was changed abruptly from an attractive recreational area to a wilderness slum..."

Graf, Wm. (Hawaii Bd. Comms. Agr. & For., Honolulu 1.) THE ROOSEVELT ELK. Port Angeles Evening News, Port Angeles, Wash. ix + 105 p., illus. 1955. $2.50. Order from publisher.

An important, readable monograph on life history, behavior, and management of Roosevelt (or Olympic) elk. It is based on a great deal of observational field work in many parts of the range, principally in Ore. Practically all topics related to field biology and conservation of this elk are discussed and the author has something interesting and significant to say about each of them. Chapters are: Early records and description; Range, distribution and habitat; Social habits and behavior; Home range; Food; Diseases, predators and parasites; Development; The rut; Conservation, past and present; Hunting, past and present. This elk still exists from nw. Calif. to Vancouver Is., from coast to Cascades, over about half its original range. There are about 16,000 in the U. S., but Ore. alone could support 75,000. Poaching is the main limiting factor. It often exterminates small herds and prevents growth of others. Market hunting still goes on to a small extent. Enforcement requires new off-pavement approach as well as education. The Roosevelt elk is a big, long-legged race well adapted to its region of dense vegetation and windfalls. It feeds mainly on the abundant browse and does well in logged areas and areas of little if any value to livestock. The elk do some damage to crops, but many damage complaints are excuses for shooting elk. The book has table of contents and 2-p. bibliography but no index.

Halloran, Arthur F. (Wichita Refuge, Cache, Okla.) A NOTE ON THE SONORAN PRONGHORN. J. Mamm. 38(3): 423. Aug. 1957.

The only U. S. antelope that fully represent the race sonoriensis are those that range on and around the Cabeza Prieta Game Range and the Organ Pipe Cactus Natl. Monument in s. Pima and Yuma counties, Ariz. "This scattered population, which is estimated to be less than 100 in number, also is known to range into northern Mexico where a recently constructed highway between the towns of Sonoita and San Luis in Sonora opens up this barren desert area to a small but constantly growing stream of traffic."

Halloran, Arthur F. (Wichita Refuge, Cache, Okla.) 50 YEARS AGO THIS FALL THE BISON RETURNED TO THE PLAINS. Animal Kingdom 60(5): 130-134, 5 photos. Oct. 1957.

How the famous Wichita bison herd began with 15 head from the N. Y. Zool. Park, and figures on how the herd grew from 15 in 1907 to 973 in 1955.

Likhachev, A. I. ADAPTIVE MORPHOLOGICAL AND FUNCTIONAL PECULIARITIES IN THE SYSTEM OF ORGANS OF LOCOMOTION IN MOOSE. Zool. Zh. 35(3): 445-458. 1956. [From Biol. Abs. 31(10).]

In Russian.

Manville, Richard H. (151 Ossining Rd., Pleasantville, N. Y.) ROE DEER IN NEW YORK. J. Mamm. 38(3): 422. Aug. 1957.

A few persist on estate in Dutchess Co.

Nielson, Errol. (Idaho Game Dept.) THE MOOSE OF EASTERN IDAHO. Idaho Wildl. Rev. 10(2): 10-13, 7 figs. Sept.-Oct. 1957.

There are moose all along the Wyo. border of Idaho, but most are up in n. part of this zone. Some moose migrate from high forests to semidesert for winter. There they feed on patches of chokecherry and bitterbrush, which are deteriorating on parts of the range. Although often solitary, moose sometimes are found in bands of 5 to 13 or more. Moose are rather fearless toward man, but not so aggressive as some stories suggest. Winter census flights have shown a rather stable population, 1949-57. Figures for censuses and hunts are tabulated. Number of moose-shooting permits has been increased from 30 to 120 in recent years. Permits are in great demand. Hunter success av. 91%. Both sexes are now shot, but more bulls than cows are shot; only a few calves are shot each year. A few moose damage crops, but hunts keep damage to a minimum.

Pavlansky, Rudolph, and Antonin Bubenik. VON WELCHEM GEWEBE GEHT DER EIGENTLICHE REIZ ZUR GEWIEHENTWICKLUNG AUS? I. MITTEILUNG: EIN VERSUCH DER TRANSPLANTATION EINES GEWIEHZAPFENS BIE EINEM DAMSPIESSER, DAMA DAMA DAMA (LINNÉ, 1758). Säugetierk. Mitteil. 3(2): 49-53. Apr. 1955. [From J. Mamm. 38(3).]

DEER (Odocoileus)

Banasiak, Chester F. 1956 HUNTING SEASON DEER WEIGHTS. Maine Dept. Inland Fish. & Game, Game Div. Leafl. Ser., 1(2): 1-8, illus. July 1957.

Based on 969 hunter-killed, hog-dressed deer. Av. wts. of bucks were, at ages of fawn, 1.5 years, 2.5 years, 3.5 years, and 4.5 years plus: 62, 108, 151, 173, and 188 pounds. Comparable data for does were: 57, 99, 110, 112, and 114 pounds. Av. for all bucks was 128 pounds. Av. for all does was 94 pounds. Figures were low because nearly half of all deer bagged were fawns and yearlings. Live weights can be estimated by adding 30%. Largest buck recorded in Maine weighed 314 pounds dressed, or about 410 pounds alive. Largest doe without antlers weighed 160 pounds dressed. A doe with antlers weighed 187 pounds dressed.

Booker, T. A. (Texas Game Comm.) 3 R'S OF DEER MANAGEMENT. Texas Game & Fish 15(10): 5-7, 27-28, 5 figs. Oct. 1957.

In 1950, Texas purchased a 6,493-acre tract of grazing land in Kerr Co. for deer studies. Ten pastures of 96 acres each were enclosed with deer-proof fence in winter of 1954-55. These were stocked with various numbers of deer

and livestock or deer alone. Two years of extreme drought then came. About 30% of deer had to be removed from livestock pastures. Nevertheless, most deer in livestock pastures died and survivors produced no fawns. Deer did well, however, in plots without livestock: only 19% died and a fawn crop of 87% was produced. Outside the deer enclosures, death loss was 50%, not counting fawns of 1956, and a 51% fawn crop was present in Oct. 1956. Various systems of regulated hunting were tried. Hunter success was about 50% whether hunters were allowed only bucks or were told which sex they had to shoot. Hunter's choice season was also tried. There was little difference between hunter's choice and specified permit method in regard to ratio of bucks to does taken. Hunters, however, preferred hunter's choice system. One of the 96-acre pastures was in a heavy cedar stand. In this there was 67% mortality and no fawn production, presumably reflecting malnutrition. Estimates are given of financial profit or loss from deer and livestock in the experiments. "...based on the findings to date, there are strong indications that, although deer may be more sensitive to adverse conditions than domestic livestock, a properly managed deer herd can bring the landowner more profit than is now derived from livestock on many Hill Country ranches."

Callaway, Lynn. (Ill. Dept. Cons.) ILLINOIS HOLDS A DEER SEASON. Outdoor Am. 22(5): 14-17, 2 figs. Sept.-Oct. 1957.

Deer began coming back in Ill. about 30 years ago and gradually increased so much that hunting became necessary. Crop damage increased. Highway kill rose to 372 in 1956. Total population may be 25,000 to 50,000. The first hunting season, 1957, was carefully planned. 33 counties were opened. Archers were given Oct. 1-15. Hunting with rifled slugs in shotguns began 15 days later. Quotas were set for each county. Permittees were given 2 choices of county and were selected by drawings when too numerous for quotas. On overstocked refuges, archers were given all of Oct., with shotgun hunters to follow if needed. All hunters selected were given instruction on need of cooperating with landowners to avoid conflicts.

DeBoer, Stanley G. (Wis. Cons. Dept., Black Riv. Falls.) WASTE IN THE WOODS. Wis. Cons. Bul. 22(10): 10-15, 3 figs. Oct. 1957.

Illegally killed deer were censused in e. Jackson Co., Wis., in spring of 1957. The area was heavily hunted but otherwise average. "1. Hunters took and registered 1,714 legal deer from eastern Jackson County. 2. Hunters killed, and left in the woods, over 3,000 illegal deer on the same area! 3. For every 10 bucks legally taken, they killed and wasted eight adult does! 4. For every 10 bucks legally taken, they killed and wasted 10 fawns! 5. For every 10 bucks legally taken, they killed and wasted better than 17 other deer! 6. In spite of their best efforts, department men succeeded in locating for salvage only one deer out of every 45 illegally laid down. (Sixty-eight were located in this area during the season.)" One illegally killed deer was found per 99 acres. If these figures are a little wrong, they are on the low side. The herd is continuing to increase despite this drain. If the waste were eliminated, Wis. hunters could take home 2-3 times as many deer each year without any different effect on the herd. Elimination of the waste, however, depends on the hunters and on sound regulations designed for bagging of excess deer.

Gill, John D. (Me. Dept. Game.) CUTTING HARDWOODS TO HELP DEER. Maine Dept. Inland Fish. & Game, Game Div. Leafl. Ser. 1(3): 1-4. July 1957.

Concise recommendations for improving carrying capacity in and near yards. Cuttings as much as a mile from a yard will be used. Cuts should be repeated, and should be small or selective. Best sprouting is from smaller, dominant trees. There is little sprouting from trees of more than 16 in. DBH, or from overtopped trees. Best species, in order, are red maple, birch, and hard maple. Best time to cut is Nov.-Mar.; poorest time is June-Aug. Top of stump should be cut on slant to limit rot. Slash should be spread rather than heaped, unless heaps are needed to protect sprouts.

Greer, Wm. E., E. B. Shotts, and F. A. Hayes. (Sch. Vet. Med., U. Ga., Athens.) A PRELIMINARY REPORT FROM THE SOUTHEASTERN COOPERATIVE DEER DISEASE STUDY. Presented at 11th Ann. Conf. SE. Assn. Game & Fish Comms. 18 p., 1 map, mimeo. Oct. 1957.

First part of paper describes the excellent system and facilities set up for this study. In addition to fine central laboratory, a fully equipped field laboratory is ready to roll at any time. Second part of paper tells of first practical test of the system. Death of about 44 deer was reported from ne. La. in Aug. 1957. Mobile laboratory was dispatched at once. An excessively heavy deer population was present: woods showed browse line in late summer, and up to 225 deer were seen in 1 pasture. Many deer fed on cotton crops. Cotton was being dusted every 4-5 days with arsenical organic phosphate combinations, as boll weevils were resistant to chlorinated hydrocarbons. Thorough post mortem studies demonstrated fatal concentration of arsenic in the 1 doe available for study. Authors suspect that main trouble in the area was arsenical poisoning. They recommend reduction of herd to point where feeding on cotton is unnecessary. "Although the recent die off was inconsequential, unless a balance is established between total deer population and carrying capacity, serious trouble from other conditions is anticipated."

Haugen, Arnold O., and Daniel W. Speake. (Iowa State Coll.) PARTURITION AND EARLY REACTIONS OF WHITE-TAILED DEER FAWNS. J. Mamm. 38(3): 420-421. Aug. 1957.

Hovind, Ralph B. (Wis. Cons. Dept., Woodruff.) "TOURIST DEER." Wis. Cons. Bul. 22(8): 3-5, 8 photos. Aug. 1957.

People want to see deer and resort owners want them to see deer. But herds must be controlled. One solution is to create small clearings along suitable roads. These clearings are managed to hold back succession and by seeding plants attractive to deer. Cutting brush and small trees provides tops and shoots to attract deer. If there are deer around, people have a chance to see them in these openings. Such openings are not appropriate in valuable timber or along busy roads, but there are many places for them. Game departments cannot afford much work of this sort, but they can recommend it to resort operators and their groups.

Keener, John M., and Donald R. Thompson. (Wis. Cons. Dept.) THE DEER UNIT: SURVEYS AND MANAGEMENT. Wis. Cons. Bul. 22(8): 6-10, 1 map. Aug. 1957.

Wis. has been divided into 76 units for deer management. Units that have similar deer conditions will have the same shooting seasons. It is necessary, therefore, to determine deer population trend in each unit. This is being done with more than satisfactory accuracy through pellet-group counts. Autumn leaf-fall covers old pellets and gives a fresh surface. All pellet groups deposited between leaf-fall and the time snow melts in the spring represent deer use over winter. In spring, a management unit is sampled by counting pellet groups on 500 plots, each of 1/50 acre. Total is divided by 13, the rate of defecation per deer-day, to get index of range use. Through simple formulas, examples of which are given, actual numbers of deer can be estimated. Confidence limits for estimates can be established. These pellet-group surveys are economical. About 16 man-days are required to cover a unit of 100,000 to 400,000 acres. Other types of surveys can be made at same time. Nine units were surveyed in spring of 1957. By using the resulting data in combination with other data one can estimate closely what population will be available to hunters and what hunting pressure is needed. The chief problem that remains is to gain public confidence in the new management system and in the reliability of the surveys on which it is based.

Lee, James A. (Minn. Dept. Cons.) WHY--AND HOW--DEER STARVE. Cons. Volunteer 20(116): 43-45, 1 photo. Mar.-Apr. 1957.

We know that deer may die of starvation when their stomachs are full. Probably there is a starvation threshold beyond which a deer cannot recover even if normally fed. But why do starving deer sometimes fail to recover when fed nutritious concentrates? We don't know, but the answer may depend on the micro-organisms of the rumen. Perhaps the micro-organisms that are present are unable to handle the new types of food. Proteins are also a problem. What is the

critical level of crude protein needed by Minn. deer to maintain normal functions? How long can deer of different classes be malnourished and still recover? We need answers to other questions too: Are some browse species badly overused simply because of their palatibility or because of their high protein content? Which browse species should be encouraged in rehabilitating deer yards?

McCullough, Robert A. (Box 639, Dugway Proving Ground, Dugway, Utah.) POSSIBLE OCCURRENCE OF IDENTICAL TWINS IN THE WHITETAIL DEER. J. Mamm. 38(3): 421-422. Aug. 1957.

Smith, Arthur D. (Utah State U., Logan.) NUTRITIVE VALUE OF SOME BROWSE PLANTS IN WINTER. J. Range Mgt. 10(4): 162-164, 2 photos. July 1957.
"Birchleaf mahogany, cliffrose, chokecherry, and oak were used as feeds in conducting digestion trials with mule deer. The digestion coefficients secured were somewhat lower than those found for sagebrush and curlleaf mahogany in earlier tests. Calculations of the total digestible nutrients reveal that the nutritive levels of the range plants tested are fair to poor during the winter months, when the tests were made." Various sources of difficulties and possible errors in the results are discussed.

MAMMALS--MARINE

Brown, S. G. MIGRATIONS OF HUMPBACK WHALES. Nature 179(4573): 1287. June 22, 1957.
Comments favorably upon and summarizes some of the findings from W. H. Dawbin's extensive studies on travels in New Zealand waters. Dawbin's paper appeared in "Trans. Roy. Soc. N. Z., 84, 1, 147; 1956."

Chiasson, Robert B. (U. Ariz.) THE DENTITION OF THE ALASKAN FUR SEAL. J. Mamm. 38(3): 310-319, 7 figs. Aug. 1957.
Study of dental pattern, development of dentition, microscopy of growth lines, and evolutionary considerations.

Davies, J. L. (U. Tasmania, Hobart.) THE GEOGRAPHY OF THE GRAY SEAL. J. Mamm. 38(3): 297-310, 7 maps. Aug. 1957.
Summary: "The gray seal exists in three distinct population groups, one in the Gulf of St. Lawrence, a second in the British Isles, Faroes, Iceland, Norway and White Sea regions, and a third in the Baltic Sea. World numbers are very small and are probably around 50,000, the East Atlantic being the biggest population group and the West Atlantic the smallest. The movements of seals within the three groups are mainly connected with feeding and are in the nature of seasonal dispersals from the breeding grounds. The West Atlantic group finally became isolated at the beginning of the last glacial (Wisconsin), while the Baltic group was separated in the post-glacial Ancylus Lake. The three groups are not only isolated geographically but also physiologically, since they have developed widely differing breeding seasons: the West Atlantic and Baltic seals breed on the ice in late winter and early spring, whereas the East Atlantic seals breed on shore in autumn. Many differences in behavior, development and morphology have been found between the three groups and between the individual colonies of the East Atlantic group."

Dunbar, M. J. (McGill U., Montreal, Can.) THE CALANUS EXPEDITIONS IN THE CANADIAN ARCTIC, 1947 TO 1955. Arctic 9(3): 178-190, illus. 1956. [From Biol. Abs. 31(9).]
"A walrus herd occurs in summer in northern Hudson Bay. Ringed seal occurs at west end of Hudson Strait. It is not truly migratory and its distribution is governed by duration of ice cover. Oldest seal, a male, was just over 40 years. Peak of pup production probably occurs near beginning of April."--Portion of abstract by W. W. Judd.

Heezen, Bruce C. (Woods Hole Oceanog. Inst., Mass.) WHALES ENTANGLED IN DEEP SEA CABLES. Deep Sea Res. 4(2): 105-115, illus., maps. 1957. [From Biol. Abs. 31(11).]
Fourteen instances of whales entangled in submarine cables are reported. All whales positively identified were sperm whales. It is concluded that sperm

whales often swim along the sea floor in depths as great as 620 fathoms. It is suggested that the whales become entangled while swimming along with their jaw plowing through the sediment in search of food. It is possible that the whales attack tangled masses of slack cable mistaking them for items of food.--From longer author's abstract.

Hubbs, Carl L. (Scripps Inst. Oceanog., La Jolla, Calif.) THE GUADALUPE FUR SEAL STILL LIVES. Zoonooz (Zool. Soc. San Diego) 29(12): 6-9, illus. Dec. 1956. [From J. Mamm. 38(3).]

Irving, Laurence, and J. S. Hart. (Arctic Health Res. Center, Anchorage, Alaska.) THE METABOLISM AND INSULATION OF SEALS AS BARE-SKINNED MAMMALS IN COLD WATER. Can. J. Zool. 35(4): 497-511, 7 figs. Aug. 1957.

Reports experiments with 2 species of Phoca. From abstract: "Tissue surface temperatures and tissue gradients reflected the metabolic response to cold, with cool surfaces and deep gradients (well insulated harp and harbor seals) corresponding to low metabolism in cold water and with warmer surfaces and shallow gradients (poorly insulated harbor seal) corresponding to high metabolism in cold water. Metabolic economy of the seals in ice water was preserved by exceptional cooling of all body surfaces (to about 1°C.), which cooling provided protection comparable to that of fur of large land mammals in coldest climates."

Klumov, S. K. THE LOCATIONS OF WHALE HERDS. Trudy Inst. Okeanol. Akad. Nauk SSSR. 18: 7-27. 1955. [From Biol. Abs. 31(8), from Referat. Zhur., Biol., 1956, No. 36253.]

In Russian. A criticism of the concept that whales are regarded as cosmopolitan, forming a unified universal herd, the representatives of which inhabit the northern and southern hemispheres. The criticism is based on the data obtained from a study of marked whales of the southern hemisphere, on the analysis of the helminth parasites and other observed factors. The author favors the recognition of different sea and ocean whale populations, that is of local herds, which have their own migration routes and their own periods of migration, their own summer areas of rest and delay and their own wintering areas. The sperm whales have two regions of herding, one, in the summer, located in the region between Khokkaido (Choccaido) and the Uruppe and the other, from the isthmus of Bussol to the Comandorsk isles.

Laws, R. M. THE ELEPHANT SEAL (MIROUNGA LEONINA LINN.). III. THE PHYSIOLOGY OF REPRODUCTION. Falkland Islands Dependencies Survey (London, H. M. S. Stationery Office), Sci. Reps. no. 15. 1-66 p., 5 pl., 17 figs. 1956. 27s. 6d., paper.

Important, detailed study based on extensive, known-age material. It covers gross and microscopic anatomy of ♂♂ and ♀♀, histology of reproduction, changes with reproductive cycles, probable endocrine relationships, and life-history significance of findings. Discussion of literature is well integrated. This paper should be seen by anyone concerned with reproduction in pinnipeds or with reproduction of mammals in general.

Sanderson, Ivan T. FOLLOW THE WHALE. Little, Brown & Co., Boston. xxiii + 423 p., illus. 1956. $6.00. [From review by Wm. E. Schevill, Sci. Monthly 85 (4).]

Schevill convincingly points out that this book is irresponsible and erroneous. "It is unfortunate that Sanderson did not profit by his own considerable bibliography."

Sergeant, D. E., and H. D. Fisher. (Fish. Res. Bd. Canada, Arctic Unit, 505 Pine Ave. West, Montreal.) THE SMALLER CETACEA OF EASTERN CANADIAN WATERS. J. Fish. Res. Bd. Can. 14(1): 83-115, illus. 1957. [From Biol. Abs. 31(9).]

"An account is given of the known records, distribution and migrations of the smaller Odontocete whales occurring in eastern Canadian waters, with measurements of specimens obtained of the rarer species. Distribution of the abundant pilot whale Globicephala melaena was studied in most detail."--Portion of authors' abstract.

Venables, U. M., and L. S. V. Venables. (Northop, Flintshire, N. Wales.) MATING BEHAVIOR OF THE SEAL PHOCA VITULINA IN SHETLAND. Proc. Zool. Soc. London 128(3): 387-396, 2 figs. June 1957.

Mating behavior is described and discussed. Possibility of a spring mating season is considered. "Counts are given of this Shetland Common Seal population to the north of Fitful Head. It has remained fairly constant at some 400 animals over the period 1954 to 1956 though many pups of up to six weeks old are slaughtered annually for their pelts."

MAMMALS--OTHER GROUPS

Burns, R. K., and Lucile M. Burns. (Carnegie Inst., Balt. 5, Md.) VIE ET REPRODUCTION DE L'OPOSSUM AMÉRICAIN DIDELPHIS MARSUPIALIS VIRGINIANA KERR. Bul. Soc. Zool. France 81(4): 230-246, illus. 1956 [1957]. [From Biol. Abs. 31(10).]

"Mainly a review, but copiously supplemented by the personal observations of the authors in northern Florida. The opossum is adaptable, and is spreading widely. Recently it has been introduced and is thriving in California, and it has spread from the South to the Canadian border and beyond. It consumes almost any food to which it has access, including garbage and carrion. It can be expected, therefore, to withstand the encroachment of civilization. Judging by trapping records, specimens do not remain in one territory long, but wander widely about. In Florida breeding individuals were found mainly in late Jan. and Feb. Farther north they breed later. There appears to be a large production of eggs compared to the number of young occurring later in the marsupium. The new-born babies are 11-12 mm in length, and weigh only 150-200 mg. The anterior appendages are functional at birth, but the posterior are not. The animals at this stage are blind, and the balance organ is not yet innervated. Yet they can find their way to the marsupium unaided by the mother. Experiments show that the young always climb upwards when possible, and at the time of birth the mother lies in such a position that the marsupial aperture is uphill from the genital opening. Once in the marsupium the young find a nipple and take it in the mouth. The end of the nipple, deep in the throat, expands and cannot be removed from the mouth except by considerable force. The young remain thus attached to the mother for nearly 2 months. Observations are reported on their activities until they leave the mother."--C. C. Davis.

BIRDS--GENERAL

Ferens, Bronislaw, Jan Sokolowski, Stefan Przybyla, K. W. Szarski, and Halina Dubicka. THE PROBLEM OF THE PROTECTION OF BIRDS IN TOWNS. Polska Akad. Nauk (Krakow), Ochrona Przyrody 24: 272-395, illus. 1957.

In Polish with long English summaries. Five papers on status, biology, and ecology of birds in Polish cities. In general, birds have decreased in cities since last war. Certain species have disappeared while a few weedy species have increased. Some of the causes are loss and thinning of trees and shrubs, excessive cleaning and cultivation around and under remaining vegetation, lack of available water in certain areas, shortage of nesting sites, illegal killing and disturbance, and predation by corvids, cats, and dogs. Recommendations are made for planting, less cultivation in restricted areas, watering and feeding stations, nesting boxes, education of public, and control of stray cats and dogs. A paper by Ferens also takes up: "the variability of birds' ethology with the progress of urbanization, the disappearance of the migration impulse and in connection with this the splitting of the population of certain species into settled and migrational groups, the increase in the density of bird populations in towns in comparison with natural habitats, the changes in the 24-hour rhythm, and the inclination of certain singing birds to deviate from their typical song and to create separate song-dialects."

Gibb, John, and P. H. T. Hartley. (Ed. Gray Inst., Oxford U., Eng.) BIRD FOODS AND FEEDING HABITS AS SUBJECTS FOR AMATEUR RESEARCH. Brit. Birds 50(7): 278-291. July 1957.

Don't let the title fool you. This is a stimulating and suggestive paper for professional and student as well as for serious amateurs. It skips stomach-

content analysis because this involves collecting and special facilities. Instead, it mentions scores of field approaches and topics, with examples and references. Among these are: how to get food data for nestlings, competition for a single food, variation in preference for foods, variation in feeding habitats, food-getting techniques, use of previously stored food, interspecific dominance in relation to short food supply, interspecific commensalism, frequency and duration of feeding, experiments with food selection, amount of protection afforded prey by protective coloration, experiments on importance of availability, and effects of birds on prey populations of various sorts.

Low, Seth H. (Patuxent Refuge, Laurel, Md.) BANDING WITH MIST NETS. Bird-Banding 28(3): 115-128. July 1957.

A great deal of good information on all aspects of choosing and using these valuable nets and on handling the birds. This paper should be read by everyone considering the use of mist nets.

MacArthur, R. H. ON THE RELATIVE ABUNDANCE OF BIRD SPECIES. Proc. Natl. Acad. Sci. 43: 293-295. 1957. [From Auk 74(3).]

"After examination through mathematical formulae of the three hypotheses, (1) Nonoverlapping Niches, (2) Overlapping Niches, (3) Niches Particulate, Not Continuous, the conclusion is reached that the first coincides most closely to field observations. It is suggested 'that, at least as a rough approximation, niches do not overlap much and are more continuous than discrete.'"

Myres, M. T., I. McT. Cowan, and M. D. F. Udvardy. (U. of B. C., Vancouver.) THE BRITISH COLUMBIA NEST RECORDS SCHEME. Condor 59(5): 308-310, 1 fig. Sept.-Oct. 1957.

From summary: A cooperative scheme for assembling data on breeding biology of birds was organized in B. C. in 1955. Aims and methods of the scheme are outlined. It is hoped that observers on the whole Pacific Coast will cooperate eventually. To date, 1600 cards covering 2700 nests or broods of 139 species have been collected and are available for use.

Serventy, D. L. (C.S.I.R.O., Wildl. Surv. Sec., Perth, W. Australia.) A BANDING TECHNIQUE FOR BURROWING PETRELS. Emu 56(3): 215-218, 2 figs. Aug. 1956.

Aluminum bands are inadequate for some marine birds, especially burrowers. Monel metal bands last but are usually hard to apply. Monel fish strap-tags used by C.S.I.R.O. proved to be easily applied by rolling about the tarsus. Application is little more troublesome than that of regular bands, for the strips bend rather easily. These bands have given perfect satisfaction for 6 years.

Stephens, T. C. AN ANNOTATED BIBLIOGRAPHY OF IOWA ORNITHOLOGY. Nebr. Ornith. Union, Occ. Pap. no. 4. v + 114 p. 1957. $3.00 from Wm. F. Rapp, Jr., 430 Ivy Ave., Crete, Nebr. [From review by F. J. Pierce, Iowa Bird Life 27(3).]

"The bibliography contains over 2,000 entries. With most of the citations there is a concise summation of the contents of the article or dated bird records." The bibliography begins in 1898, where the Bartsch Iowa bibliography stopped, and continues through 1947.

BIRDS--MORPHOLOGY, PHYSIOLOGY, BEHAVIOR, MIGRATION

Belopolsky, L. O. OVIPOSITION DATE OF THE MARINE BIRDS AND FACTORS DETERMINING THE OVIPOSITION DATE. Zool. Zh. 35: 1522-1534. 1956. [From notice by J.M.C., Ibis 99(3).]

In Russian with English summary. "The dates of laying of five species of sea-birds in different parts of the Barents Sea are compared. The complicated pattern formed on a map by joining places of the same laying date is similar in all the species and is attributed to the benevolent influence of the North Atlantic Drift. Places in southern Novaya Zemlya are shown to have the same laying date as others ten degrees farther north in Franz Josef Land."

Christman, Gene M. (MVZ, U. Calif., Berkeley.) SOME INTERSPECIFIC RELATIONS IN THE FEEDING OF ESTUARINE BIRDS. Condor 59(5): 343. Sept.-Oct. 1957.
"It appears from these observations that egrets often purposely follow diving mergansers and cormorants and they appear to catch occasional fish frightened into shallow water by the diving birds. In each case the egrets had to run to keep abreast of the advancing divers."

Gelineo, S. (Fac. Sci., U. Belgrade.) TEMPERATURE D'ADAPTATION ET PRODUCTION DE CHALEUR CHEZ LES OISEAUX DE PETITE TAILLE. [Adaptation temperature and heat production in small birds.] Arch. Sci. Physiol. 9(3): 225-243, illus. 1955. [From Biol. Abs. 31(11).]
"In several species of small birds, direct calorimetry shows that chronic metabolic heat production is inversely proportional to environmental temperature. Adaptation of heat production takes 1-4 weeks, depending on species. With conditioning to high environmental temperature, body temperature at thermal neutrality increases. With conditioning to low temperature, peak metabolic response to cold occurs at a lower temperature than in unconditioned birds and the lethal level of cold air is lowered. In rats these adaptive processes show seasonal variation; this was not investigated in birds."--W. F. Hewitt.

Huber, J. UEBER DIE TAUCHTIEFEN UNSERER WASSERVÖGEL. Ornith. Beob. 53: 5-9. 1956. [From notice by J.M.C., Ibis 99(3).]
"Records of underwater depths reached by various water birds."

Kramer, G., J. G. Pratt, and Ursula v. St. Paul. (Max Planck-Inst., Wilhelmshaven, Germany.) TWO DIRECTION EXPERIMENTS WITH HOMING PIGEONS AND THEIR BEARING ON THE PROBLEM OF GOAL ORIENTATION. Am. Nat. 91(856): 37-48, 5 figs. Jan.-Feb. 1957.
Homing trials made in various areas and from various directions gave diverse results ranging from success to failure. "It is thought that regional differences may exist in the physical substrate which provides orientation clues. Regional differences of this sort may be connected with, or represent another aspect of the directional differences in homing."

Lack, David, John Gibb, and D. F. Owen. (Ed. Gray Inst., Oxford U. Eng.) SURVIVAL IN RELATION TO BROOD-SIZE IN TITS. Proc. Zool. Soc. London 128(3): 313-326. June 1957.
"These findings accord with the view that the normal breeding season of the Great and Blue Tits is that when they can raise most young, and that their clutch size is in general adapted to the number of young that they can raise."

Lanyon, Wesley E. THE COMPARATIVE BIOLOGY OF THE MEADOWLARKS (STURNELLA) IN WISCONSIN. Nuttall Ornith. Club (Cambridge, Mass.) Publ. no. 1. 67 p., illus. 1957. [From review by Monica de la Salle, Aud. Mag. 59(4).]
Result of 4-year study of meadowlarks where breeding zones of e. and w. forms overlap near Madison, Wis. "Various chapters cover the ecological aspects of distribution, an analysis of the development of song territory, behavior, and the question of interbreeding."

Marshall, A. J., and C. J. F. Coombs. (St. Bartholomew's Med. Coll., U. London, Eng.) THE INTERACTION OF ENVIRONMENTAL, INTERNAL AND BEHAVIOURAL FACTORS IN THE ROOK, CORVUS F. FRUGILEGUS LINNAEUS. Proc. Zool. Soc. London 128(4): 545-589, 5 figs., 4 pl. July 1957.
Detailed histological study of gonadal cycle and correlation of this cycle with reproductive behavior in spring and fall and with environmental conditions. There is an internal rhythm of reproduction, based on cyclical changes in gonads, which causes strong tendency toward reproductive behavior in autumn. The productive spring breeding apparently is governed by a combination of such factors as progressive increment of light (not simply length of day), temperature, and food supply.

Marshall, A. J., and H. J. deS. Disney. (St. Bartholomew's Med. Coll., U. London, Eng.) EXPERIMENTAL INDUCTION OF THE BREEDING SEASON IN A XEROPHILOUS BIRD. Nature 180(4587): 647-649. Sept. 28, 1957.

Cage studies of a major African pest, Quelea quelea, the red-billed weaver finch. Within 3 months after leaving nest, young have strong urge to build nests. This urge cannot be expressed until habitat provides tall green grass for weaving. Experimentally, rainfall in itself lowers, rather than increases, the number of ovulations but not the number of complete nests. Internal rhythm of reproduction exists. This rhythm is modifiable by external conditions, including, perhaps, rainfall and social stimulation. Reproduction is possible at age of 9 months.

Myres, M. T. (U. of B. C., Vancouver.) CLUTCH SIZE AND LAYING DATES IN CLIFF SWALLOW COLONIES. Condor 59(5): 311-316, 2 figs. Sept.-Oct. 1957.

Study of 2 colonies in B. C. Factors affecting size of clutch and choice of nesting site are discussed. It is believed that the smaller clutches are produced by birds breeding for the first time.

Nice, Margaret Morse. (5725 Harper Ave., Chicago 37, Ill.) NESTING SUCCESS IN ALTRICIAL BIRDS. Auk 74(3): 305-321. July 1957.

Summary: "The success rate of open nests of altricial birds in the North Temperate Zone has been found in 24 studies on 7,788 nests to range from 38 to 77 per cent, averaging 49. In 29 studies involving 21,951 eggs, fledging success ranged from 22 to 70 per cent, averaging 46. For hole-nesting altricial birds, fledging success of 94,400 eggs in 33 studies ranged from 26 to 94 per cent, averaging 66. Fledging success in 6 studies on species with partially enclosed nests averaged 44, 44, 55, 57, 59 and 63 per cent. Various favorable and unfavorable factors for nesting success are discussed. In 18 European and 10 North American hole-nesting passerines, the brood is vulnerable for about 38 days; a loss of 34 per cent of the eggs and/or young would average 0.9 per cent per day. In 54 European and 11 North American open-nesting passerines, loss of eggs and/or young would average 1.9 per cent per day for about 29 days, while the loss of nests would average some 1.8 per cent per day. A newly-hatched precocial bird corresponds in some respects to a passerine that has just left its open nest. A success rate of 45 per cent was found in 5,597 galliform nests; the loss here might average 1.6 per cent per day. An average loss of 0.8 per cent of the nests per day was found for diving ducks nesting over water in pot-holes, and of 1.6 per cent per day for dabbling ducks nesting on the uplands. The figures for nesting success refer to nesting attempts; low percentages are usually compensated by a larger number of attempts."

Parmelee, David Freeland. THE ANNUAL AVIAN BREEDING CYCLE AT HIGH LATITUDES IN THE CANADIAN ARCTIC. Ph.D. thesis, U. Okla. 272 p. 1957. [From abstract in Dissertation Abstracts 17(8).]

Work was done on Ellesmere and Axel Heiberg islands in 1955. The paper gives data on periods in which birds arrived and departed, local conditions in these periods, time of reproduction of various birds, and discusses the problem of whether reproductive activities were speeded up in adjustment to brevity of summer. On the whole, there was little evidence of such acceleration.

Richardson, Frank. (Dept. Zool., U. Wash., Seattle.) THE BREEDING CYCLES OF HAWAIIAN SEA BIRDS. Bul. Bernice P. Bishop Mus. 218. 1-41, illus., map. 1957. [From Biol. Abs. 31(10).]

"Summarizes main environmental conditions on islands along the Hawaiian chain, as these affect breeding of sea birds. Notes distribution and breeding cycle of 22 spp. of sea birds, and their non-breeding ranges. Analyzes factors governing breeding cycles of these birds by seasons."--E. H. Bryan, Jr.

Serventy, D. L., and A. J. Marshall. (C.S.I.R.O., Wildl. Surv. Sec., Perth, W. Australia.) BREEDING PERIODICITY IN WESTERN AUSTRALIAN BIRDS: WITH AN ACCOUNT OF UNSEASONAL NESTINGS IN 1953 AND 1955. Emu 57(2): 99-126, 6 figs., 2 pl. May 1957.

Histological and field studies demonstrated that breeding of both land and water birds in W. Aust. was regulated by precipitation rather than length of day. This is regarded as an adaptation to an arid land. Low temperatures tend

to inhibit breeding. "It is held that photo-periodicity is of relatively little importance as a regulator of the sexual cycles of most Western Australian birds, excluding sea-birds."

Wagner, Helmuth O. ON YEARLY AND DAILY RHYTHM IN MIGRATORY BIRDS. Z. Tierpsych. 13(1): 82-92. 1956. [From abstract by M. M. Nice, Bird-Banding 28 (3).]

In German. "Eleven charts are given showing activity in recording cages of various birds kept under changing rhythms of light and darkness. 'It is concluded that migratory activities are dependent on an endogenous rhythm, while the everyday changes of periods of activity and rest are determined by external factors.'"

Whitaker, Lovie M. (1204 W. Brooks St., Norman, Okla.) A RÉSUMÉ OF ANTING, WITH PARTICULAR REFERENCE TO A CAPTIVE ORCHARD ORIOLE. Wilson Bul. 69(3): 194-262, 5 figs. Sept. 1957.

A very comprehensive review of this subject; includes 11 p. bibliography. All ant species used by the oriole for anting were found to produce a burning sensation on the human tongue; others did not. It seems that all ant species used by birds for anting may have thermogenic (burning) properties. Since many substitute materials used for anting have this property, "heat" may be the common factor in most if not all anting. Birds seem to use only ants that spray or exude repughatorial fluids. Records of anting in birds obviously infested with ectoparasites are rare. Endoparasites should be studied as a possible factor in anting. It is possible that ant substances relieve itching caused by minute ectoparasites or cysts of endoparasites. Also, birds appear to derive sensual pleasure, possibly including sexual stimulation, fro the thermogenic effect of ants. In recognizing "heat" as the common anting factor, smoke must be given consideration as an anting substance. Smoke-bathing is virtually unknown in the W. Hemisphere. Instances of birds performing alike with ants, smoke, and burning or heated materials, all seem cases in point.

BIRDS--MANUALS, FAUNAS, COMMUNITIES

Anon. REFUGE BIRD LISTS. US F&WS, Wildl. Leafl. 384. 2 p. May 1957.

List of publications in the Refuge Bird List series, numbers 101-185. The national wildlife refuge to which each bird list pertains is stated. Revisions are indicated. Each of the bird lists mentioned is a 4-page leaflet that characterizes the area briefly and gives a checklist of its birds, with indication of status and abundance. Single copies of each list can be obtained on request to refuge, regional, or Washington offices.

Homes, R. C., et al. THE BIRDS OF THE LONDON AREA SINCE 1900. Collins, London. x + 305 p., 40 photos, 3 maps. 1957. 30s. [From review by B. C., Ibis 99(3).]

"A short introduction and twelve chapters occupy the first 117 pages. R. S. R. Fitter describes the physical setting; various authors deal with the birds of the major habitats, from Inner London to the remaining agricultural land; E. R. Parrinder writes on migration over and through London and, with S. Cramp and B. A. Richards, on roosts and fly-lines. The systematic list, in small type, runs from p. 118 to p. 296 and includes 245 full species (of which 110 have bred) recorded within 20 miles of St. Paul's Cathedral from 1900 to 1954. Some species receive as much as two pages and there is an appendix of ten doubtful species. Finally, a full bibliography and an index to all species mentioned. The illustrations show many habitats of the area and some of its birds. The book, the work of a special committee of the London N.H.S., is a remarkable synthesis of effort."

Johnson, John Cristopher, Jr. HABITAT PREFERENCES AMONG REPRESENTATIVE WINTERING AND BREEDING BIRDS OF THE CENTRAL OKLAHOMA FOREST-PRAIRIE ECOTONE. Ph.D. thesis, U. Okla. 129 p. 1957. [From abstract in Dissertation Abstracts 17(8).]

Marshall, Joe T., Jr. (U. Ariz.) BIRDS OF PINE-OAK WOODLAND IN SOUTHERN ARIZONA AND ADJACENT MEXICO. Pacific Coast Avifauna no. 32. 1-125 p., 26 figs., 2 col. pl. Mar. 1957. $5.00 cloth, from Cooper Ornith. Soc., C. V. Duff, 2911 Antelo View Drive, Los Angeles 24, Calif.

An attractive monograph that is primarily an analysis of ecological factors governing numbers and distribution of birds in the pine-oak zone. It is based on field work over 3 years in various areas. It contains much information on natural history and ecology of the birds studied. Marshall describes his study areas and their floras and presents a valuable discussion of the ecology and history of the pine-oak woodland, with special consideration of fire and grazing. He then reports on censuses of breeding birds in different localities and discusses the distribution of species in relation to ecological factors. Some interesting examples of feeding behavior are described. Habitat preferences of species are discussed and tabulated. The discussion of altitudinal races leads to the conclusion that such races are really geographical rather than altitudinal. Interspecific competition, discussed in some detail, was seen to result frequently in competing species avoiding each other. Species accounts (p. 69-121) vary greatly in length. Most of them emphasize feeding behavior, foods, and habitat preferences; some consider territorial behavior.

McEwen, Eoin H. (Can. Wildl. Serv., Ottawa.) BIRDS OBSERVED AT BATHURST INLET, NORTHWEST TERRITORIES. Can. Field-Nat. 71(3): 109-115. July-Sept. 1957.

Annotated list that "consists of data on the spring and autumn migrations, nesting habits, seasonal activities and habitat preferences of the birds observed in this area."

Munro, J. A. (Okanagan Landing, B. C.) OBSERVATIONS OF THE WINTER WATERFOWL POPULATION AT MORRO BAY, CALIFORNIA. Murrelet 38(2): 9-25. May-Aug. 1957.

Morro Bay, San Luis Obispo Co., is an important wintering ground for waterfowl. Many other water and shore birds also use the bay. The author describes the area, gives notes on some of the mammals, discusses the large amount of illegal shooting of birds of all sorts, and gives a long annotated list of birds. Annotations pertain to dates of occurrence; abundance in different winters; behavior; and mortality from shooting, oil, and other causes.

Pettingill, O. S., Jr., R. R. Graber, and Jean W. Graber. (Wayne, Me.) THE SUMMER BIRDS OF WILDERNESS STATE PARK, MICHIGAN. Jack-Pine Warbler 35(2): 43-63, 1 map, 1 pl. June 1957.

Description of park and its major habitats and annotated list of species. Annotations pertain to status, habitat, and nesting records. Based on intensive work in 2 summers and observations made over many years.

Snyder, L. L. (Roy. Ont. Mus., Toronto.) ARCTIC BIRDS OF CANADA. U. Toronto Press. x + 310 p., illus. 1957. $4.75.

An excellent, detailed, semitechnical guide to birds of extreme n. Canada and the arctic islands. Numerous good black and white drawings by T. M. Shortt assist in identification. Map for each form shows range and every known breeding area in the region. Each bird is treated under several headings. "Additional Names" lists local names, including native names. "Status" discusses abundance, occurrence, and travels. "Habitat" takes account of seasonal and geographic variation in habitats. "Characteristics" describes recognition characters of adults in field and in hand, and, when necessary, in different plumages. It also describes young and downy young, eggs, and nest. "Remarks" discusses any problems of subspecies, spotlighting deficiencies of knowledge, and may include biological notes. Birds whose occurrence in the extreme Arctic is occasional, erratic, or hypothetical are discussed concisely but informatively in an appendix. A glossary covers the few technical terms used. A map locates places mentioned. The book closes with a selected bibliography of 5.5 pages and an index. Snyder's work was carefully prepared and will be extremely useful to both amateurs and professionals who work with birds of the Far North.

Urban, Emil K. (Mus. Nat. Hist., U. Kans., Lawrence.) BIRDS OBSERVED AT RESOLUTE BAY, CORNWALLIS ISLAND, NORTHWEST TERRITORIES. Passenger Pigeon 19 (2): 73-75. Summer 1957.

Watson, Adam. (U. of Aberdeen, Scot.) BIRDS IN CUMBERLAND PENINSULA, BAFFIN ISLAND. Can. Field-Nat. 71(3): 87-109, 1 map. July-Sept. 1957.
Long and detailed annotated list with much information on such topics as occurrence, abundance, variation, foods, and nesting. The work was done with the Baird Expedition of 1953.

Wetmore, Alexander, committee chairman. CHECK-LIST OF NORTH AMERICAN BIRDS. 5th edition. Am. Ornith. Union. xiii + 691 p. 1957. $8.00, cloth, postpaid, from Am. Ornith. Union, Fernow Hall, Cornell U., Ithaca, N. Y.
This valuable reference has been long awaited. The 4th edition was published in 1931 and work on the 5th began in 1939. The present version is up to date and much improved. Statements of ranges are much longer and more detailed. Emphasis is on the species rather than the subspecies: common names are given only for species; ranges are described for species as well as subspecies. Both breeding and wintering ranges are outlined and fossil records are listed. Area covered by the volume is Am. north of Mexico plus Baja Calif., Greenland, and Bermuda. The book represents an enormous amount of work by scores of authorities. It incorporates many taxonomic changes from the 4th edition and it will be the standard authority for vernacular names.

Williamson, Francis S. L. (Arctic Health Res. Center, Anchorage, Alaska.) ECOLOGICAL DISTRIBUTION OF BIRDS IN THE NAPASKIAK AREA OF THE KUSKOKWIM RIVER DELTA, ALASKA. Condor 59(5): 317-338, 7 figs. Sept.-Oct. 1957.
Study was made in summers of 1955 and 1956. "A brief discussion of the climate, topography, and general ecological setting of this area is presented. Placing emphasis on the life-form of the vegetation, a list of ten ecologic formations is discussed and employed to analyze the distribution of birds. Sixty-two species of birds were recorded... An annotated list, with data from specimens, is presented. Two species, the Goshawk and the Arctic Loon, fluctuated markedly in abundance between the two years. In addition, several species were scarce or absent in the area, although they were present in nearby localities in similar vegetational and topographic formations. The direct effects of climate, or other physical factors, are suggested as influencing at least some of these distributional patterns. Additional studies of habitat relations and climate as they influence each species at various localities in the area are needed." From summary.

BIRDS--POPULATIONS & FLUCTUATIONS

Bruns, Herbert. FURTHER RESULTS OF BIRD COLONIZATION EXPERIMENTS IN BEECH WOODS. Ornith. Mitt. 8(11): 201-206. 1956. [From abstract by R. O. Bender, Bird-Banding 28(3).]
In German. In an endeavor to find if birds can control forest insect pests, bird populations have been increased by supplying numerous nest boxes, as previous reports have shown. In the present study, 25 and 50 boxes per ha. were placed in various uniform beech woods. Plots were of 4-9 ha., but 1 was of 1 ha. "The lowest population determined on a test plot in terms of broods fledged was 2.2 per hectare while the highest (on the one hectare plot) was 19.0. The maximum for a normal sized plot was 13.0 broods, which the author considers a better value. Plots with southwest exposure had higher densities than those facing west or northwest. Densities were higher on the edges of the test plots than in the centers. High densities were principally due to increases in the population of Pied Flycatcher. An excess of nesting boxes is considered desirable in order to provide the birds with a choice of sites and also to provide sleeping quarters for the males."

Bruns, H. VERSUCHE ZUR STEIGERUNG DER SIEDLUNGSDICHTE DER VÖGEL IN EICHEN- UND EICHENMISCHWÄLDERN. Waldhygiene 1: 220-226. 1956. [From notice by J.A.G., Ibis 99(3).]
"Experiments demonstrating the rise in the density of hole-nesting birds with the provision of nest-boxes. Unfortunately the various Parus spp. were not separated."

Campbell, Bruce. A COMPARISON OF BIRD POPULATIONS UPON "INDUSTRIAL" AND "RURAL" FARMLAND IN SOUTH WALES. Cardiff Nat. Soc. Reps. & Trans. 81: 4-65. 1950-52. [From long review by R. A. Norris, Auk 74(3).]

Norris considers this an excellent study. Apparently no similar project has been carried out. Campbell made population studies of birds of normal farmlands and partially industrialized rural areas. He estimated both breeding and wintering populations. In general, summer populations were about 20% higher in strictly rural areas. Time and success of nesting were closely alike in both habitats. Winter populations were about the same in both. Numerous species were intolerant of industrialized areas. Biomass of winter birds was estimated; it appeared to be greater on rural farmland. Status of common species in the region seems to have been stable for perhaps 50 years, but on the whole, bird populations have been impoverished by industrialization. Campbell gives other analyses of his data. Norris mentions some of these and presents various details of the study.

Czarnecki, Zygmunt. ECOLOGICAL OBSERVATIONS OF BIRDS IN THE GOLECIN WOOD NEAR POZNAN IN 1952. Polska Akad. Nauk, Acta Ornith. 5(4): 113-158, illus. Nov. 1956.

In Polish; English summary. 511 pairs of birds nested in a woods of 26.9 ha. 160 pairs of these comprised a colony of Corvus frugilegus. Aside from this colony, av. density of birds was 1304 pairs per sq. km. Density varied in different sections of the woods, ranging from 1 pair per 178 sq. m. in willow clump to 1 pair per 3186 sq. m. in pine stand. 43 species nested in area, 12 others visited to feed. 189 nests were found; 57% were destroyed by people and animals. A relationship was observed between numbers of birds and numbers of suitable nest sites. Pine stands had relatively few birds of relatively few species. Many birds that fed in pine forest did not nest there. Strictly territorial species had smaller territories in environment favorable to the birds. Data are given on plants most used for nesting and on phenology of return of birds in spring.

Czarnecki, Zygmunt. MATERIAL ILLUSTRATING THE ECOLOGY OF BIRDS NESTING IN CLUMPS OF TREES SURROUNDED BY OPEN FIELDS. Ekologia Polska, Ser. A, 4(13): 379-417, 2 maps. 1956 (1957).

In Polish with 2-p. English summary. Birds were studied in the park of a country house and in a cemetery surrounded by trees but otherwise in the middle of fields. Among topics considered were productivity of the populations, vertical distribution of nests, and ratio of open nests to hole nests. Data are given on usage of different species of trees. Factors affecting population fluctuations in the study plots are discussed. Author concludes that no 2 sites are quite alike in their bird populations and in vertical distribution of birds. It is clear, however, that plots such as those studied have large numbers of birds; this is important in view of the many small clumps of trees that occur in the Wielkopolski region of Poland.

Davis, John, and Laidlaw Williams. (Hastings Reservation, Carmel Valley, Calif.) IRRUPTIONS OF THE CLARK NUTCRACKER IN CALIFORNIA. Condor 59(5): 297-307. Sept.-Oct. 1957.

From summary: Irruptions occurred in 1898, 1919, 1935, 1950, and 1955. Invasion of Monterey Bay region in 1955 and behavior of invaders are discussed. Nutcrackers depend on pine cones for winter food. Calif. irruptions appear to occur when unusually large population has low food supply on winter range. Irruptions correlate with failure of cone crops after 2 or more years of large crops that permitted increase of population.

Gruzdev, V. V. DISTRIBUTION AND SIZE OF POPULATION OF INSECT-EATING BIRDS IN FORESTS. Biull. Moskovskovo Obshchestva Ispytatelei Prirody. Biol. 60(4): 67-72. 1955. [From Biol. Abs. 31(9).]

In Russian.

Richdale, L. E. A POPULATION STUDY OF PENGUINS. Oxford U. Press, London. iii + 195 p., 2 pl. 1957. 42s. [From review by L. H. Matthews, Nature, July 6, 1957.]

An exceptionally thorough, long-term study of a population of individually marked yellow-eyed penguins in N. Z. A colony of about 400 birds was visited 1,318 times. Histories of individuals were followed for as much as 17 years. Results of 819 matings were traced. "As a result of his work the author was able to assess the precise composition of a penguin community and the proportions of juveniles, non-breeders and breeders, with, in many cases, their blood-relationship to each other, and the sex-ratio. Among many other matters, he also discusses the influence of age and other factors on breeding success, and the survival and mortality rates of juveniles and adults."

Taylor, J. S. NOTES ON THE BIRDS OF INLAND WATERS IN THE EASTERN CAPE PROVINCE, WITH SPECIAL REFERENCE TO THE KAROO. Ostrich 28: 1-80. 1957. [From abstract by R.E.M., Ibis 99(3).]

"Regular and systematic observations over nearly 10 years are used to show how changing conditions, often drastic, affected the birds frequenting an irrigation lake in the Karoo. Fluctuations in the birds' numbers are correlated as far as possible with water-level, weather and season, and are compared with those in a smaller dam not subject to such violent changes of level. Sixty-nine species of 'birds associated with water' are dealt with separately. A generalization suggested by the observations is the 'extreme restlessness of many species which are not migrants in the usual sense.'"

Turček, F. J. ZUR FRAGE DER DOMINANZ IN VOGELPOPULATIONEN. Waldhygiene 1: 249-257. 1956. [From notice by J.A.G., Ibis 99(3).]

"A rather involved paper in which the author distinguishes dominance in terms of the number of individuals, biomass, and surface area of body, and discusses differences in the composition of the avifauna in different types of woodland."

BIRDS--CONTROL, MORTALITY

LaFave, Lynn D. (Spokane, Wash.) MORE SEA BIRDS AFFECTED BY OIL. Murrelet 38(1): 8. Jan.-Apr. [Aug.] 1957.

Further data on birds affected by oil from wreck of freighter Seagate. In Grays Harbor Co. and Clallam Co., Wash., author observed the following dead, oiled birds: 368 white-winged scoters, 24 surf scoters, and 73 common murres. This was a small part of the kill. Apparently effects extended along many miles of beach. Another paper on this example of oiling is abstracted in WR 87: 56.

Tusnádi, G. DÉFENSE BIOLOGIQUE PAR DES RAPACES CONTRE LES ALIÈRES NUISIBLES DE NOS ÉTANGS À POISSONS. Allattani Közlemények (Hungary) 4: 239-242. 1954. [From abstract by F.J.T., Ibis 97(4).]

"An interesting application of falconry to the protection of ponds against fish-eating birds, especially herons. The first trials have been made with Goshawks. The herons were flushed out of the ponds and moved to the side-channels, where their activity is of less importance."

BIRDS--PARASITES AND DISEASES

Bigland, C. H. (Vet. Lab., Alberta Dept. Agr., Edmonton.) ISOLATION OF ERYSIPELOTHRIX RHUSIOPATHIAE FROM A GOLDEN EAGLE. Can. J. Comp. Med. & Vet. Sci. 21(8): 290-291. Aug. 1957.

This erysipelas organism was found in all organs cultured from a golden eagle killed in northern Alberta. The bird revealed no gross sign of the infection. It had been feeding on carrion in an area in which swine erysipelas was known to exist.

Finlay, Peter Stevenson. TOXOPLASMA IN WILD BIRDS. Ph.D. thesis, Syracuse U. 92 p. 1957. [From abstract in Dissertation Abstracts 17(8).]

211 birds of 8 species were tested by innoculations into mice. Toxoplasma was demonstrated from crows. "...the crow strain produced an acute fatal infection in mice, rabbits and hamsters and an asymptomatic chronic infection in albino rats. Of 13 crows innoculated, infection occurred in 3 and the parasites were found in blood and other tissues for short periods of time."

Hugghins, Ernest J. (S. Dak. State Coll., Brookings.) ECOLOGICAL STUDIES ON A TREMATODE OF BULLHEADS AND CORMORANTS AT SPRING LAKE, ILLINOIS. Trans. Am. Microsc. Soc. 75(3): 281-289, illus. 1956. [From Biol. Abs. 31(9).]

"At Spring Lake, near Savanna, Ill., strigeid trematode, Hysteromorpha triloba, was found to have life cycle involving double-crested cormorant, Phalacrocorax auritus auritus, as definitive host, snail, Gyraulus hirsutus, as 1st intermediate host, and black bullhead Ameiurus melas, as 2nd intermediate host. History and flora and fauna of Spring Lake reviewed. Ecological relationships of 3 hosts of H. triloba at lake discussed. During 1949-50, incidence of infection with metacercariae in large population of bullheads was practically 100%. This was of economic concern because it led to serious decrease in fishing activity in lake with recreational value calculated about $86,000 per year. In 1951, flooding Mississippi River adjacent to Spring Lake washed out many infected bullheads and brought in uninfected stock. In months following flood, nets were set at intervals leading away from cormorant rookery, and bullheads showed decrease in rate of infection correlated directly with distance from rookery. Implications discussed."--Author.

Kissling, R. E., R. W. Chamberlain, W. D. Sudia, and D. D. Stamm. (US Pub. Health Serv., P. O. Box 61, Montgomery, Ala.) WESTERN EQUINE ENCEPHALITIS IN WILD BIRDS. Am. J. Hyg. 66(1): 48-55. July 1957.

Kissling, R. E., D. D. Stamm, R. W. Chamberlain, and W. D. Sudia. (US Pub. Health Serv., P. O. Box 61, Montgomery, Ala.) BIRDS AS WINTER HOSTS FOR EASTERN AND WESTERN EQUINE ENCEPHALOMYELITIS VIRUSES. Am. J. Hyg. 66(1): 42-47. July 1957.

Nibley, Carlyle, Jr. THE IXODID TICKS OF BIRDS ON THE PATUXENT RESEARCH REFUGE. M.S. thesis, U. Md. 138 p. 1957.

QUAIL

Agee, C. Phillip. (Nebr. Game Comm.) THE FALL SHUFFLE IN CENTRAL MISSOURI BOB-WHITES. J. Wildl. Mgt. 21(3): 329-335, 2 figs. July 1957.

Spatial and social changes in a population of marked wild bob-white quail were traced. Special attention was given to the fall season. Movements during this period were found to be restricted. The formation of coveys brought together birds whose summer ranges had been close together. Of 5 coveys, 4 were composed of 2 families each plus unmated males and possibly unsuccessful pairs. One covey had young of only one family. The results suggest that, with adequate habitat, Mo. quail often establish winter ranges within a few hundred yards of the hatching point.--Author.

Durell, James S. (Ky. Dept. Wildl. Resources.) BOBWHITE ONE OF KENTUCKY'S MOST IMPORTANT SPECIES. Ky. Happy Hunting Ground 13(5): 14-15, 20, 2 figs. Sept. 1957.

Recent studies of Ky. quail fluctuations have shown that one of the best indicators of increase or decrease is number of young killed per hour of hunting. This was more consistent, and in better agreement with other findings than age ratios determined from wings. If age ratios are to be used at all to compare populations of different years and different areas, the data should be taken from comparable months. Questionnaire data from farmers gave unexpectedly good information on quail population trends. Efforts are made to get such data from 10 farmers in each county. Adequate amounts of rainfall are important: almost every measure of quail populations indicated increases in 1955 and 1956, when precipitation was above normal, over the preceding drought years.

Durell, James S. (Ky. Dept. Wildl. Resources.) A FIVE-YEAR STATE-WIDE QUAIL POPULATION STUDY IN KENTUCKY. Presented at 11th Ann. Conf. SE. Assn. Game & Fish Comms. 8 p., mimeo. Oct. 1957.

Study of quail population trends since 1952 was made with aim of finding reliable index. Tables report results. Conclusions: "1. At present there is no way to detect small changes in state-wide quail populations. Therefore, the accuracy of a measurement technique or prediction cannot be determined. 2. Farmer questionnaires appear to give a fairly accurate estimate of quail production. Small marginal quail farms probably are best for this survey. 3. Juvenile kill per hour of hunting appears to be a better index of quail production than the adult:juvenile ratio. 4. Adult:juvenile ratios in bagged quail apparently vary from month to month. 5. Above normal rainfall in April, May or June seemed to increase the number of quail broods hatched during the succeeding month."

Haugen, Arnold O., and Dan W. Speake. (Iowa State Coll., Ames.) BOBWHITE AGE-WEIGHT RELATIONSHIP AND THE OPENING DATE OF THE HUNTING SEASON. Presented at 11th Ann. Conf. SE. Assn. Game & Fish Comms. 7 p., 2 graphs. Oct. 1957.

It is good for hunting to start as soon as the quail population reaches its peak for the year, for then the most birds are available. But it is not good for hunting to begin while there are many undersized birds. When is the best time to open the season? This paper answers the question for Ala. Quail of various ages were weighed. Young were practically like adults in weight by age of 90 days. If the season opened 90 days after 75% of quail hatch was completed, a hunter with a bag of 10 would have an av. of 2 slightly underweight quail. This would not be objectionable. In recent years, 90 days after completion of 75% of hatch was from Oct. 22 to Nov. 23. Seasons actually opened Nov. 20-27. In most years, best opening date would be Nov. 10-15, for weather conditions are seldom satisfactory for quail hunting before then. Any necessary year-to-year adjustments in opening date could be made in ample time on basis of the regular cock-call counts. Exceptionally high productivity in a given year could be detected by wing studies early enough to permit longer season or higher bag limit in latter part of season.

Kipp, Friedrich A. THE GENUS COTURNIX--AN INVASION BIRD GROUP. Die Vogelwarte 18(3): 160-164. 1956. [From abstract by Frances Hamerstrom, Bird-Banding 28(3).]

In German. These quails show gypsy types of mass movements that are comparable in some ways to those of crossbills. "The Quails' pointed wings apparently are an adaptation, not only for migration, but for widespread wandering. The range of this genus is uncommonly large for a gallinaceous bird: Africa, Madagascar, Europe, Asia, and Australia. This paper and that of Meise (Die Vogelwarte, 17(3): 211-215) lead the reviewer to question the wisdom of introducing this genus with its weedy spread potential into the United States."

Klimstra, Willard D., and Thomas G. Scott. (S. Ill. U., Carbondale.) PROGRESS REPORT ON BOB-WHITE NESTING IN SOUTHERN ILLINOIS. Presented at 11th Ann. Conf. SE. Assn. Game & Fish Comms. 10 p., mimeo. Oct. 1957.

Factual summary, with tables, of 6-year study. The study area was 1800 acres of representative farmland that was not managed for quail. The quail population increased steadily, 1952-57. Data on 352 nests was obtained by intensive searching and revisiting. Clutch size was 6-24, av. 13.2. Hatching success was 25.0 to 52.8%, av. 39.4%. Av. brood size was 11.7. Poorest hatch, in 1954, was associated with unusually high temperatures in June. 36% of nests were abandoned for various reasons. 25% of nests were lost to predation, especially in pastures. Predation on nests tended to vary with populations of predators. Nests that hatched before July had larger clutches and better success than later ones. Nesting success was 49.3% on idle land and only 25.9% on agricultural land. Use of agricultural land for nesting increased from 29% in 1st half of season to 44% in last half. About 80% of nests were in land that was not intensively farmed. Very few nests were in burned or overgrazed tracts. Only 1 nest was in row crops. About 90% of nests were within 60 ft. of some sort of edge. Distribution of nests and breeding quail was correlated with openness of understory. Most nests were, however, in mature, lodged cheatgrass, broomsedge or bluegrass. Farmers gradually reduced amount of quail cover during the 6 years of study. This was only partly compensated for by presence of fallow fields, and depressing effect on population should appear in relatively near future.

Kozicky, Edward L. (Olin Mathieson Chem. Corp., E. Alton, Ill.) ESTIMATION OF AUGUST QUAIL POPULATIONS IN IOWA. Iowa Bird Life 27(3): 63-69. Sept. 1957.

Summary: "1. The fall quail census data are analyzed from 1939 through 1953 for 32 counties. 2. The possibility of using a probability (random) sample of forties (land units of about 40 acres) was investigated as a means of estimating August quail population changes within specified limits of precision. 3. Aerial photos were used to increase the efficiency of random sampling by permitting the rapid classification of our quail range universe into three types of forties, which are based on likelihood of quail occupancy in August. 4. In August, 1956, a pilot survey was made of 14 Iowa counties, constituting the primary quail range, by conservation officers. 5. The unbias estimate of occupied forties in the 14 counties was 0.542, or 54.2%--a surprising abundance of quail. 6. The standard error of the estimate of occupied forties was 0.0564 and the 95% confidence limits of forties occupied by quail was estimated to be between 0.43 and 0.66 or between 43 and 66 per cent. 7. Little efficiency was gained in separating the A and B type forties for August counts. 8. The regression technique for renewing the annual sample holds promise and should be studied further. 9. Iowa conservation officers were quick to grasp the technique and conducted their field operations without any noticeable difficulty."

Reeves, J. H., T. H. Ripley, and H. S. Mosby. (Va. Poly. Inst., Blacksburg.) QUAIL AND LIVESTOCK. Va. Wildl. 18(10): 20-22, 6 figs. Oct. 1957.

Livestock production has soared and crop acreage has plunged in Va. since the 1930s. Small fields and brushy fencerows have yielded to large open pastures and clean wire fences. Studies at Va. Poly. Inst. farm of 2,300 acres have shown what such changes meant to quail. Where there were about 12 quail per 100 acres in 1950, there were only about 4 per 100 acres in 1956. Similar changes are widespread. All that can be done to improve the situation for quail is purposeful habitat management. Graphs show trends in Va. livestock production and crop acreage, 1900 to date, and trend of fall quail populations on V. P. I. farm, 1947-56.

Ripley, Thomas H. THE BOBWHITE IN MASSACHUSETTS. Mass. Div. Fish. & Game, Bul. no. 15. ii + 20 p., 8 figs. 1957.

Semipopular result of much research. Discusses seasonal habits, foods, fluctuations, history of stocking, present status, and management methods (including artificial feeding). Summary: "1. The bobwhite, once distributed throughout Massachusetts, is now restricted to the southeastern section of the state. These coastal areas are characterized by having milder winters and vegetative types that provide more favorable quail habitat. 2. Under the present season (October 20 to November 20) and bag limits (5 per day, and 25 per season), the harvest of quail is minor and does not limit populations. 3. Stocking pen-reared quail to supplement or increase native populations is ineffective. 4. The contribution of pen-reared birds to quail hunting is small, but these birds do provide some shooting. Survival observations and band returns clearly show that the recovery of quail liberated in the fall can be increased, greatly, by releasing birds just prior to the opening day. 5. The restoration of habitat by establishing and maintaining food patches for winter use by quail is the least expensive and most effective means of increasing quail."

Robinson, Thane S. THE ECOLOGY OF BOBWHITES IN SOUTH-CENTRAL KANSAS. U. Kans. Mus. Nat. Hist. & State Biol. Surv. Kans., Misc. Publ. no. 15. 1-84 p., 2 pl., 11 figs. Sept. 1957. Price not stated.

Monograph based on 3 years of field work on 640-acre game preserve in Barber Co. Sections are devoted to study area, food habits, sex and age ratios, population dynamics, breeding season activities, weights, temperatures, individual movements, covey ranges and territoriality, behavior and selection of habitat, effects of light intensity, and management. Foods came chiefly from 3 habitats, all in early seral stages. Food plots were well used in season. Food was not considered limiting factor. Population increased 1946-55 as area reverted from cultivation. Increase of dense grass in 1 habitat, however, may have reduced carrying capacity. Population increased with favorable rainfall, declined with drought. Apparently population could not regain peak size in 1 year after severe reduction. Rate of decrease was greatest when population was highest. Mated males were thought to whistle more often than usually supposed. Weights

of adults were greater in winter than summer. Coveys used small areas of dense, woody vegetation as "headquarters." These areas were spaced at an av. of 138 yards, suggesting covey territoriality. Coveys required areas of at least 12 acres, and these areas had to have "headquarters." Study of microclimatic factors led to finding that light intensity was important regulator of daily and seasonal behavior. Quail avoided places of more than 1000 foot-candles of incident light. This strongly affected use and choice of cover. The light threshold may increase during the non-breeding season. Hunting season should be early, before many birds have disappeared. Regulations should take account of population fluctuations. Reliable index of population variations can be computed easily from current climatic records, which could save much annual field work. Maximum carrying capacity may be 54 coveys per sq. mi. in late autumn. Covey "headquarters" should be planned, either as strips or islands of dense, woody cover. These should be of plants that provide suitable amounts of shade in fall and winter. Juniper is 1 good choice for this use.

Stanford, Jack A. (Mo. Cons. Comm.) COTURNIX OR JAPANESE QUAIL INVESTIGATIONS IN THE UNITED STATES / A PROGRESS REPORT / OCTOBER 1957. Presented at 11th Ann. Conf. SE. Assn. Game & Fish Comms. 8 p., typescript. Oct. 1957.

The coturnix program has been botched by everyone jumping on the bandwagon before the facts were in. Exaggerated claims were made and thousands of coturnix were turned over to sportsmen for public relations purposes. An experimental program was transformed into a massive release program. More than 230,000 coturnix, many of them unbanded and unrecorded, were released in at least 16 states in 1956 and 1957. It would have been better if a few states had tackled the problems scientifically. Missouri, which began coturnix work, kept the project experimental but had to make mass releases for this purpose. So far, band returns indicate that the birds are migratory. Birds have scattered in all directions, but especially southward. Success of the program cannot be predicted in 1957, but results may be clear in 1958, when some states will stop releases. Coturnix hens must be able to get away from ♂♂ before they can bring off broods; ♂♂ do not permit them to complete incubation. Both 9-month and 10-week-old birds produced young on release areas; apparently the 10-week-old birds produced as well as the older ones.

Wallmo, O. C. (Texas Game Comm.) A STUDY OF BLUES. Texas Game & Fish 15(8): 4-7, 8 figs. Aug. 1957.

Popular summary of recent research on scaled quail in Trans-Pecos Texas. Birds are in large coveys from Oct. to Apr. Breeding begins in Mar. or Apr. Clutches av. 14. Incubation lasts about 3 weeks. Hatching may occur from May to Sept. Young attain adult size and plumage in 22 weeks. Covey ranges vary in shape and cover about 1 sq. mi., but only part of range is used on any 1 day. Each covey has distinct and more or less exclusive range. There is little permanent movement of individuals to ranges of other coveys. No migration from deteriorating range was noted. Dry winter and spring, with scarcity of green vegetation, results in poor reproductive success. When rainfall for year was 4.5 in., nesting season was short and there was only 0.3 young per adult in winter. When rainfall for year was 11.9 in., nesting season was long, there were 3.9 young per adult in winter, birds were heavier, and storage of vitamin A in liver was higher. Scaled quail do use water but there is much evidence that they get along well without it, and that management need not try to supply it. Extensive artificial feeding is out of the question. Wholesale predator control is both impracticable and needless. The quail need brush for shade, roosting, escape cover. Mixed-brush range with a sprinkling of cactus is highly favorable--if the range is not overgrazed, especially by sheep. Such range quickly supplies the birds' needs when rainfall becomes adequate.

Westerskov, Kaj. (N. Z. Wildl. Div., Wellington, N. Z.) HISTORY AND DISTRIBUTION OF THE BOBWHITE QUAIL IN NEW ZEALAND. N. Z. Dept. Int. Affairs, Wildl. Publ. no. 43. 1-8 p., 3 figs. (Reprinted from N. Z. Outdoor 21(10): 12-14, 35-36.) Nov. 1956.

Although released in many parts of N. Z., bobwhites persist only in a few localities in 1 area, which is in ne. part of N. Island.

Williams, G. R. (N. Z. Wildl. Serv., P. O. Box 8007, Wellington, C.I., N. Z.) CHANGES IN SEX RATIO OCCURRING WITH AGE IN YOUNG CALIFORNIA QUAIL IN CENTRAL OTAGO, NEW ZEALAND. Bird-Banding 28(3): 145-150. July 1957.

Data for trapped birds indicate that ♂♂ make up only 28% of population of 6-9-week-old birds and that the sex ratio shifts gradually with age so that 64% of adults are ♂♂. American data for various species of quail agree, but have not been gathered so as to show that much of the change occurs in early age groups. It is no longer acceptable to assume that preponderance of ♂♂ among adults may be accounted for solely by risks and stresses of breeding ??. We still need to know true sex ratio at hatching and at ages up to 6 weeks.

Author also proposes terminology for age groups of quail in general: Chicks--first primary wing molt not begun. Juveniles--first primary wing molt in progress. Immatures--this molt completed. Adults--general post-nuptial molt completed. Corresponding ages are approximately 0-4 weeks, 4-25 weeks, 25 weeks to 12 months, and 12 months or more.

PHEASANTS

Campbell, Howard. (N. M. Dept. Game.) BAND RETURNS FROM '56 PHEASANT SEASON HUNT IN NEW MEXICO. N. M. Wildl. 2(9): 4, 9, 11. Sept. 1957.

Data on kills of game-farm birds are tabulated for 1955 and 1956 and results are discussed. About half of the pheasants stocked on an area were shot when some of the stocking was done during the open season and hunters were carefully checked. Kills were little higher when part of state had 9-day season than when whole state had 2-day season. Very few stocked birds survived to the next year. The real pheasant range of N. M. is already fully stocked with wild birds. With artificial stocking, each bird bagged costs more than a resident bird license. It is a waste to stock hens where they cannot be shot legally. The only defensible way to use game-farm birds for public hunting in N. M. is to release them directly before the guns in areas where there are few or no wild pheasants and to hunt them over a long season with no bag limits. The goal should be to harvest every one of them.

Fant, R. J. (I.C.I. Game Res. Sta., Fordingbridge, Hampshire, Eng.) CRITERIA FOR AGING PHEASANT EMBRYOS. J. Wildl. Mgt. 21(3): 324-328, 16 sketches. July 1957.

The mortality of pheasant embryos during incubation is discussed, together with the chronological appearance of visible criteria for the purpose of establishing the age at death or backdating clutches in nests encountered in the field.--Author's summary.

Grondahl, C. R. (N. Dak. Game Dept.) PHEASANT MORTALITY. N. Dak. Outdoors 20(3): 14-16, 1 graph. Sept. 1957.

Contains good data on highway mortality of wildlife, including especially good figures on monthly highway losses of pheasants in part of N. Dak.

Harris, Stanley W. (Minn. Dept. Cons.) PHEASANTS, FLOODS, AND FACTS. Cons. Volunteer 20(119): 1-8, 8 maps. Sept.-Oct. 1957.

Heavy rainfall in June 1957 gave rise to much fear for the pheasant crop in Minn. Facts, figures, and maps given here show that the heaviest rainfall was not in good pheasant country and that road counts made after the storms give every reason to think that the 1957 pheasant population should be above av. despite the rains.

Hart, Chet. (Calif. Dept. Game.) LEGAL HEN SHOOTING HELPS HUNTERS SET PHEASANT RECORD. Outdoor Calif. 18(6): 4-6, 1 photo. June 1957.

Hunters in n. Calif. were allowed to shoot one hen pheasant in 1955. The kill of hens increased the bag by about a third. It would have cost at least half a million dollars to have achieved this increase by stocking game-farm birds. Before the season, 2.5% of hens carried shot. After the season, 5% carried shot. 28-34% of cocks carried shot. Thus the percentage of hens killed probably about doubled but was only about 1/7 as great as kill of cocks. The kill of hens had no apparent ill-effect: pheasant populations in 1956 were even higher than in 1955. With more birds available in 1956, hunters concentrated more on males; the proportion of hens in the bag dropped. Author concludes that there are more females than are needed to maintain or increase the population and that it is wasteful not to shoot some of them.

Seubert, John Lyman. OBSERVATIONS ON THE RENESTING BEHAVIOR OF THE RING-NECKED PHEASANT. Ph.D. thesis, Ohio State U. 137 p. 1956. [From long abstract in Dissertation Abstracts 17(6).]

Renesting of game-farm pheasants was studied in a pen of 7.85 acres in 2 years. Nesting was deliberately disrupted at different stages. Many hens would nest twice, a few 3 times, none 4 times a season. First clutches av. larger and more fertile. On av., renesting was most likely when disruption came early in incubation and early in season. Also on av., the later in incubation disruption occurred, the longer before renesting. Study of a hypothetical example led to conclusion "that successful reproduction can be realized if nest disruption occurs early enough in a season for a maximum of renesting to occur or late enough so that a major portion of the initial nests has already hatched. The example is discussed in relation to studies of wild pheasant populations and, though theoretical, gives a plausible explanation of the nesting behavior and final productivity observed by other investigators." Double peaks in nesting and hatching curves indicated renesting, as often deduced from field data by others.

Westerskov, Kaj. (N. Z. Wildl. Div., Wellington, N. Z.) NEW PHEASANTS THROUGH BREEDING RESEARCH. N. Z. Dept. Int. Affairs, Wildl. Publ. no. 45. 1-11 p., 4 photos. (Reprinted from N. Z. Outdoor 22(4): 12-15.) June 1957.

Discusses 2 U. S. projects on hybrid pheasants. Wis. has developed the "Wis. green pheasant" in effort to get a bird that will nest at dates and places that will result in fewer losses by mowing. Ohio has developed the "Quintex pheasant," a 5-race hybrid, to get a bird of sufficient genetic variability that some individuals will be able to make a go of it in s. Ohio. These projects are described, possible benefits are outlined, and some reservations about the projects are expressed.

GROUSE, PARTRIDGE, ETC.

Ammann, G. A. (Mich. Dept. Cons.) THE PRAIRIE GROUSE OF MICHIGAN. Mich. Dept. Cons., Tech. Bul. 1-200 p., 53 + 17 figs., 1 col. pl. 1957.

A long-awaited report based on 3 PR projects covering 17 years. It traces the rise and fall of Mich. prairie chickens and sharp-tailed grouse in correlation with changing habitat. There is an account of introduction of sharptails into the lower peninsula and of attempts to hasten the spread of this species by releasing wild-trapped birds. Much information is given on travels, habitat preferences, winter habits, foods, age identification, sex and age ratios, breeding success, survival, interspecific relationships, effect of hunting, and inventory methods. Management is discussed for both species. The history of prairie grouse in Mich. is a classic example of effects of land-use on wildlife. Prairie chicken range reached its maximum about 1930 following widespread removal of forest and expansion of agriculture. Sharptails began to invade the upper peninsula about 1920, and gradually replaced prairie chickens as cover increased and succession proceeded toward forest. Today there is doubt that the trend can be halted at a stage where either species can prosper. Better fire protection and replanting of forest are unfavorable to prairie grouse. Attempts have been made to open the habitat by controlled burning and herbicides, but this is too expensive to be practicable over large areas. Various suggestions are made for retarding succession in managed areas, but there seems little likelihood that prairie grouse will again become dominant species over a large part of Mich. This long paper is well summarized, well printed, and has an exceptionally good index.--Fred H. Dale.

Bohl, Wayne H. (N. M. Dept. Game.) A STUDY OF THE INTRODUCTION, RELEASE AND SURVIVAL OF ASIATIC GAME BIRDS. N. M. Dept. Game & Fish, Job Completion Rep., Proj. W-58-R-5, Job no. 4. ii + 84 p., illus., proc. 1957.

Analysis of N. M. effort to establish Turkish chukar and extensive review of literature on life history of Turkish and Indian chukars, especially in U. S. The first part is a detailed account of work in N. M. It tells of importations and game-farm rearing, dispersion, past and future release sites, habitat conditions, census techniques, and food habits. Turkish chukars released in N. M., 1951-57, total 2,539. Indian chukars also have been released. Dispersion has been wide and rapid. Breeding has occurred in the wild despite severe drought,

but establishment is not certain. Author recommends that future releases be made of well-fed subadults or breeders in late winter, in mild weather, in favorable habitat, and that follow-up releases of 300-400 birds per site be made each year for 3 years. If other exotic game birds are imported, more information should be provided on the birds and their native habitats. The second part of this report is a useful review of data on such topics as: differences between Indian and Turkish chukars, sexing, aging, reproduction, feeding, water relationships, resting and roosting habits, calls, altitudinal movements, travels, predation, mortality, diseases and parasites, and competition with native game birds. 80 references are cited.

Dorney, Robert S., and Frederick V. Holzer. (Wis. Cons. Dept., Ladysmith.) SPRING AGING METHODS FOR RUFFED GROUSE COCKS. J. Wildl. Mgt. 21(3): 268-274, 4 figs. July 1957.

A new aging method developed for ruffed grouse cocks trapped in spring was based on the use of 6 age criteria--diameter of 9th primary shaft, diameter of central tail feather shaft, length of central tail feather, bursa, primary contour, and primary feather sheathing. With these multiple criteria, spring cocks were classified as juveniles or adults with a high degree of accuracy.--Authors.

Edwards, Malcolm G. (N. C. Wildl. Resources Comm.) RUFFED GROUSE MANAGEMENT IN NORTH CAROLINA. Presented at 11th Ann. Conf. SE. Assn. Game & Fish Comms. 8 p., mimeo. Oct. 1957.

From summary: Western N. C. has grouse populations comparable to those of good grouse range in Pa. Grouse were underhunted for various reasons, including inaccessibility and lack of experienced grouse hunters. Grouse hunting was publicized and regulations were liberalized to allow 3.5 months of hunting and 3 grouse per day. All management areas were opened. Shooting lanes were cut through good grouse range. Plantings of clover and food-bearing trees were made to improve habitat and concentrate birds for hunters. Shooting lanes are considered the most important step. A heavy program of lane-cutting was undertaken in spring of 1953 on management areas. Kill on these areas increased from 85 in 1952 to 241 in 1953 and has remained over 200. Notes are given on foods and habitats of grouse and on costs of lane-cutting.

Gullion, Gordon W. (Nev. Game Comm., Austin.) PRECOCIAL STRUTTING IN SAGE GROUSE. Condor 59(4): 269. July-Aug. 1957.

All phases of strutting display were exhibited briefly by bird about 8 weeks old. Most individuals are still very inept at strutting when 10 months old.

Hartkorn, Fred L. (Mont. Game Dept.) MONTANA BLUE GROUSE. Mont. Wildl., June 1957, p. 28-31, 2 figs. June 1957.

Dendrogapus o. richardsonii may seem fearless at times, but they become wary and sporting under hunting. They range in the mountain fir zones from 2,000 ft. to at least 9,000 ft. Broods have av. only 3.3 young in July-Aug. of recent years. Seasonal movements appear to be correlated with feeding conditions. Populations have fluctuated considerably. They were larger some 20 years ago than more recently. A low was reached in 1946 and a high in 1952. Of birds bagged, about 68% are young. Sexes are equal in these, but only 26% of adults bagged are ♀♀. Land management trends are favorable, with lighter grazing and selective or small block cutting on national forests. Legal hunting has little effect on populations, and hunters probably cover less than 10% of the grouse range. A relatively long season is therefore justified.

Kuzmina, M. A. ECOLOGY AND MORPHOLOGY OF ALECTORIS GRAECA DZUNGARICA SUSHK. AND TETRAOGALLUS HIMALAYENSIS SEWERTZOWI GRAY. Zool. Zh. 34(1): 175-190. 1955. [From Biol. Abs. 31(11).]

In Russian.

Lemke, C. W. (Wis. Cons. Dept.) THE HUNGARIAN PARTRIDGE. Wis. Cons. Bul. 22(10): 19-22, 3 figs. Oct. 1957.

Data on stocking history, present distribution, and status in Wis. Huns are exceptionally winter hardy, with overwinter loss of about 40% compared to some 60% for Wis. quail. They occupy a niche (open land) not filled by other game birds and are expanding their range n. and w. in state. Their population is not high but it is huntable and not hurt by hunting.

Paludan, K. PARTRIDGES RINGED DURING 1950-54. Danske Vildtundersøgelser 7: 1-27. 1957. [From abstract by J.S.A., Ibis 99(3).]

In Danish with English summary. "A detailed analysis is made of the recoveries (2.8%) of 8225 hand-reared marked Partridges Perdix perdix released in 1950-1954. Excluding recoveries in the year of release, a mean annual mortality of 83.9 ± 3.8% (M ± S.D.) is indicated. Survival until the first breeding season was five times greater among adults and sub-adults released in November than among young released in July-August. Chick mortality was high and expectation of life of adults was low. There was little evidence of movement away from release areas."

Sandfort, Wayne W., editor. (Colo. Game Comm., Grand Junction.) WESTERN STATES EXOTIC GAME BIRD COMMITTEE SEMI-ANNUAL NEWSLETTER 1957. i + 11 p., mimeo. 1957.

This committee was formerly known as "Western States Chukar Partridge Committee." It will now have only 1 major report per year and a semi-annual newsletter, of which this is 1st. The present newsletter gives tabular data for w. states and provinces and Hawaii on: chukar reproduction in 1957; precipitation and food conditions on chukar ranges in 1957; estimated fall populations of chukars in 1957; 1957 hunting regulations for chukars; results of chukar hunting in 1956; releases of game-farm chukars in period Mar. 1 to Aug. 31, 1957; water developments made mainly or partly for chukars; list of active projects on exotic game birds; and list of 10 research needs in these projects. It is interesting, if not alarming, to note the number of exotics now under study in the region: chukars, grey francolins, black francolins, Barbary partridges, Coturnix quail, Spanish red-legged partridge, sand grouse, seesee partridge, and European grey partridge. Most of these presumably are not yet established. Aside from Coturnix and chukar, any one species apparently is being tried by only 1 or 2 states.

TURKEY

Holbrook, Herman L. (S. C. Wildl. Resources Comm.) THE FRANCIS MARION TURKEY PROJECT. Presented at 11th Ann. Conf. SE. Assn. Game & Fish Comms. 14 p., mimeo. Oct. 1957.

From summary: The project has been in operation since June 1948. It assures perpetuation of wild turkey, provides overflow of game into surrounding areas, provides turkey and deer for restocking, and fills part of the need for quality public hunting. Management consists of clearing, planting, prescribed burning, control of livestock, and protection. 500 acres are cleared and kept open. About 300 acres of crops are planted each year to supplement native game foods. Prescribed burning of pine stands is done on 3-year rotation to keep understory open. 150 deer and 241 turkeys have been taken for restocking elsewhere. The state's first public hunting was begun last year with good results on archery and still hunts on the Waterhorn Tract, and with fair results on drive hunts held on Wambaw Tract. Public hunting will be expanded in 1957. The paper describes a type of cannon-net trap specialized for turkeys.

Thomas, Jack, and Houston Green. (Texas Game Comm.) SOMETHING TO GOBBLE ABOUT. Texas Game & Fish 15(11): 9-11, 24, 7 photos. Nov. 1957.

Heavy rains in 1957 increased vegetation and aided turkey reproduction on Edwards Plateau of Texas. Table shows sex ratios and breeding success in 4 counties. The rains broke a long, severe drought; depleted turkey populations responded promptly. On the other hand, many ranchers are restocking with livestock as rapidly as they can. The habitual overgrazing, coupled with brush-removal programs, do not bode well for turkeys. One dramatic photo shows a range that has been reduced to a stony desert by overgrazing and cutting and burning of cedar.

Goodwin, D. OBSERVATIONS ON THE VOICE AND SOME DISPLAYS OF CERTAIN PIGEONS. Avic. Mag. 62: 17-33, 63-70. 1956. [From notice by W.C.D., Auk 74(3).]
"The comparative behavior of several species of pigeons, mostly Streptopelia and Columba, is discussed. This is illustrated by drawings and concluded with a discussion of the phylogeny of the forms treated."

Handley, Rolland B., and Wm. R. Edwards. (Miss. Game Comm.) MOURNING DOVE NESTING STUDIES IN MISSISSIPPI. Presented at 11th Ann. Conf. SE. Assn. Game & Fish Comms. 9 p. + 3 p. of figs., mimeo. Oct. 1957.
State and federal workers banded 1503 nestling doves in Miss. in 1956 and 2518 in 1957. Banding was done in 12 counties but study was concentrated in 2 main areas. Nests were visited at approximately 10-day intervals, but authors strongly recommend making visits at 7-day intervals or more often. Richest nesting area was a small orchard of large pecan trees, some of which had 5-7 dove nests. Large tags were attached to trees to identify and help locate nests. Nest data were recorded on these tags. Lower part of each tag, bearing all necessary data, was detached for permanent record. The tags served well in 2 areas but led to destruction of nests by youths in 1 area. Greatest amounts of information were obtained in the Parchman area, where authors learned the production history of 973 nests. Here hatching success for all accountable eggs was 71.2%. Av. production per nest was 1.41 birds. Abandonment accounted for 5.3% of nests, destruction for 9.1%. Twenty-seven birds died. Data for another area were similar: hatching success was 73.4% and production per nest was 1.53.

Morse, Wm. B. (3146 N.E. 10th Ave., Portland 12, Ore.) THE BAND-TAIL--ANOTHER FOREST CROP. Am. For. 63(9): 24-25, 32, 34, 5 photos. Sept. 1957.
General article on biology and management of this pigeon. These birds are highly vulnerable to hunting because they concentrate at mineral springs for weeks in autumn. They are easily injured by shot, crippling rate is high, and many downed birds--perhaps half--are not found. The attraction of mineral springs apparently is chlorides. Band-tails decoy readily, but hunters in Ore. do not use decoys. Instead, hunters mass around the mineral springs, which pigeons become desperate to reach. The birds may nest twice a year in Calif., but in Ore. each pair seems to produce only 1 egg a year. In Ore., hunters bag more than 3 adults per each young. Hunting pressure has increased, but bag limits have been reduced. The recent population decline seems to be leveling off. States n. of Calif. bag mostly resident pigeons, but Calif. has a chance at nearly the whole coastal population in winter. Interstate and federal cooperation is necessary. Most mineral springs good for pigeon shooting are on private land and the best ones are commercialized. Pigeon use of springs can be encouraged by leaving trees and stubs standing; some owners are doing this. Kills at a given spring hold up year after year with moderate shooting but decline under heavy shooting. Thus management can be based on control of kill at individual springs.

Peters, Harold S., committee chairman. (US F&WS, Peachtree-7th Bldg., Atlanta 23, Ga.) CURRENT STATUS AND PROBLEMS OF MOURNING DOVE INVESTIGATIONS IN THE SOUTHEASTERN STATES. Presented at 11th Ann. Conf. SE. Assn. Game & Fish Comms. 4 p., mimeo. Oct. 1957.
Far more doves are shot than ducks and geese combined. About $15 million worth of shells were shot at doves in 1955. This provided 13% of Federal Aid funds appropriated that year. Despite this importance, little work is being done on doves. Only the annual call count is participated in by all se. states. In 1956, 13,270 doves were banded in the SE., 84% of them in 4 states. Relatively few nestlings were banded. Bag checks are made in 7 se. states, random roadside counts in 6. Dove research is being done in only 1 se. school. Indications are that hunting does not destroy dove populations; regulations have been liberalized in each of last 3 seasons. Several courses of action are recommended: 1. More banding of nestlings. 2. Analysis of band recoveries to show where doves are produced in relation to points of kill, and to provide mortality data. 3. Call-count routes should be randomized promptly to give better population data and to permit area-to-area comparisons. 4. Areas should be studied to calibrate data from call-count routes. 5. Statistically sound method of getting kill figures should be developed. 6. Illegal kill and crippling loss should be evaluated. 7. Data should be gathered on mortality

factors at all seasons. 8. Efforts should be made to measure production in time to set regulations in same year. 9. Measures for habitat management should be studied. Many phases of the program could be handled by grants for graduate studies.

WATERFOWL

Boyd, Hugh. (Wildfowl Trust, Slimbridge, Gloucestershire, Eng.) EARLY SEXUAL MATURITY OF A FEMALE MALLARD. Brit. Birds 50(7): 302-303. July 1957.
Apparently laid eggs at age of less than 5 months and brought off brood. Perhaps late autumn broods, which are frequent in mallard, are produced by early-maturing females. Many of these late broods are failures.

Cooch, Graham. (Can. Wildl. Serv., Ottawa.) MASS RINGING OF FLIGHTLESS BLUE AND LESSER SNOW GEESE IN CANADA'S EASTERN ARCTIC. 8th Ann. Rep. Wildfowl Trust: 58-67, 2 figs. 1957.
Describes capture by herding into pens and briefly discusses banding results. "In the three summers 1952-54, 15,000 geese were ringed on Southampton Island and at a colony at Eskimo Point, North-West Territory. Over 10% have already been recovered. These recoveries, and live recaptures, have provided much information on the migration pattern of the species, on the areas in which the populations are most heavily shot, and on the extent of return to the breeding colony in succeeding years... This ringing programme will make possible detailed studies of the population structure. Preliminary calculations suggest many similarities between the structure of the Snow Geese population and that of the Pink-footed Goose."

Crissey, W. F., compiler. 1957 STATUS REPORT OF WATERFOWL. US F&WS, Spec. Sci. Rep.--Wildl. no. 37. ii + 122 p., 4 maps. Aug. 1957.
"These data are brought together for the purpose of supplying administrators with all factual information available concerning current waterfowl population status, and is intended for use primarily as a guide for setting the 1957-58 shooting regulations." Data are based on 3 surveys: kill during last hunting season, wintering grounds, and breeding grounds. Results are discussed and summarized for each flyway. Results of population and production studies made on breeding grounds in 1957 are given in considerable detail for each region within a flyway. Increase, decrease, or no change is predicted for each region of the breeding grounds and for each flyway as a whole. Many of the statements and figures pertain to individual species. In general, the southward flights of 1957 are expected to be about equal to those of 1956. Coots, however, should be more numerous.

Flint, V. E. A CONTRIBUTION TO THE BIOLOGY OF THE COMMON EIDER. Biull. Moskovskovo Obshchestva Ispytatelei Prirody. Biol. 60(4): 53-62. 1955. [From Biol. Abs. 31(9).]
In Russian.

Frith, H. J. (Wildl. Surv. Sect., C.S.I.R.O., Canberra.) BREEDING AND MOVEMENTS OF WILD DUCKS IN INLAND NEW SOUTH WALES. C.S.I.R.O. Wildl. Res. 2(1): 19-31. July 1957.
Summary: "In inland Australia the erratic semi-arid climate has led to the development of irregular movement patterns and breeding seasons in wild ducks. Whilst some species are sedentary and have quite regular breeding seasons, others are completely nomadic and breed whenever and wherever conditions may be suitable. There is a similar division of habits among individuals of the same species. This paper reviews what is known of the breeding seasons and movement patterns of the different species of wild ducks occurring in the interior of New South Wales."

Frith, H. J. (Wildl. Surv. Sect., C.S.I.R.O., Canberra.) WILD DUCKS AND THE RICE INDUSTRY IN NEW SOUTH WALES. C.S.I.R.O. Wildl. Res. 2(1): 32-50, 3 graphs. July 1957.
Summary: "The ecology and economics of wild ducks in the irrigated rice-growing areas of New South Wales have been investigated. Grey teal and black duck [Anas gibberifrons and A. superciliosa] periodically cause some damage to

crops; but only a small part of the population is involved, and the attacks are usually confined to those areas in the crops where growth is unsatisfactory for other reasons. The wood duck [Chenonetta jubata] is capable of causing more serious damage to rice, and on some occasions does appreciable damage to isolated or neglected crops. The amount of damage caused by ducks is correlated with climatic conditions; and it is concluded that wild ducks are, on the whole, a very minor pest to the rice-growing industry. The value of shooting and the importance of cultivation practices in relation to the duck problem are discussed."

Haartman, L. von. POPULATION CHANGES IN THE TUFTED DUCK, AYTHYA FULIGULA (L.). Comment. Biol. (Helsinki) 16(5). 11 p. 1957. [From abstract by R.E.M., Ibis 99(3).]

"A census of Tufted Ducks in an area in the archipelago of S.W. Finland, carried on for 21 years, showed a high density in the 1930's, a decline in the 1940's and an increase in the 1950's. The decline was probably caused by severe ice during four winters. Observations in support have been made in other parts of the Finnish archipelago and a similar trend has been found in some other water-birds. G. Elfving contributes an appendix on the statistical analysis of incomplete data."

Harrington, Lyn. TRIUMPH OF THE TRUMPETER. Beaver 286: 14-19, 4 photos. Winter 1955.

Popular account of trumpeter swan: early exploitation, present conservation, notes on reproduction and foods.

Humphrey, Philip S. (Peabody Mus., Yale U., New Haven, Conn.) OBSERVATIONS ON THE DIVING OF THE SURF SCOTER (MELANITTA PERSPICILLATA). Auk 74(3): 392-394, 1 fig. July 1957.

Information on techniques used by various kinds of scoters in diving and swimming underwater.

Klopfer, Peter H. (Windsor Mt. Sch., Lenox, Mass.) AN EXPERIMENT ON EMPATHIC LEARNING IN DUCKS. Am. Nat. 91(856): 61-63. Jan.-Feb. 1957.

Proof that ducks can learn to avoid danger simply by watching other ducks. The ducks that did so were caged where they could see other ducks learn to avoid a food dish that was placed on a colored background and surrounded by an electric grid that gave shocks.

Kozlov, V. V. MASS MORTALITY OF DUCKS IN THE OKSK NATIONAL PARK (RIAZAN REGION) IN THE SPRING OF 1949. Zool. Zh. 35(3): 472-473. 1956. [From Biol. Abs. 31(10).]

In Russian.

Lumsden, H. G. (Ont. Dept. Lands & For., Maple.) A SNOW GOOSE BREEDING COLONY IN ONTARIO. Can. Field-Nat. 71(3): 153-154. July-Sept. 1957.

A colony of snow geese nests near Cape Henrietta Maria. An Indian hunter reports that these birds began breeding in the area about 10 years ago and have been increasing rapidly.

Mackay, R. H. (Can. Wildl. Serv., U. of B. C., Vancouver.) MOVEMENTS OF TRUMPETER SWANS SHOWN BY BAND RETURNS AND OBSERVATIONS. Condor 59(5): 339. Sept.-Oct. 1957.

"...Swans raised in the Peace River District of Alberta migrate to the northern United States and mingle with swans from the Red Rock Lakes Refuge in Montana during the winter months." Evidence is also given that the young of a family remain together for at least the first year after hatching.

Rate, Henry. (Colo. State U., Fort Collins.) REDHEADS KILLED BY A DOWNDRAFT. Auk 74(3): 391. July 1957.

A flock of about 40 Aythya americana was driven downward onto ice. Four birds were killed and 3 were seriously injured.

Rollin, Noble. (World Bird Res. Sta., Glanton, Northumberland, Eng.) INCUBATION BY DRAKE WOOD DUCK IN ECLIPSE PLUMAGE. Condor 59(4): 263-265, 1 graph. July-Aug. 1957.

Scott, Peter, and Hugh Boyd, editors. (Wildfowl Trust, Slimbridge, Gloucestershire, Eng.) THE EIGHTH ANNUAL REPORT OF THE WILDFOWL TRUST, 1954-1956. 1-155 p., illus. 1957. 10s.

This issue consists of a number of short research papers and several relatively routine lists and reports. It includes papers on: geese that used the Trust's grounds, geese banded and redistributed in Britain, ducks banded in Britain, results of wildfowl counts in British Isles, distribution of 8 spp. of wildfowl in British Isles, breeding of wildfowl on Trust's grounds, list of research projects under way, how to make and use large and small funnel traps for ducks, reports on recoveries of banded grey lag geese and ducks of several spp., brief report of visit to Uganda, narration of visit to Delta (Manitoba) station, mass banding of flightless blue and lesser snow geese in Canada, waterfowl conservation in N. Am. since 1945 (reprinted from Wilson Bul. 67(4): 310-312), white-fronted geese of England and Wales (races, numbers, distribution, mortality statistics), the Russian home of British-wintering ducks (description of nw. Russia and discussion of region's development and settlement in relation to duck production), and use of hand-reared ducks for supplementing wild populations (short discussion of pros and cons; based largely on Am. papers).

Soper, J. Dewey. (7115 81st St., Edmonton, Alberta.) NOTES ON WILDFOWL OF SLAVE RIVER DELTA AND VICINITY, NORTHWEST TERRITORIES. Can. Field-Nat. 71(2): 74-81. Apr.-June 1957.

Status and relative abundance of all species of loons, grebes, and anseriforms known from area. Observations on migration routes and seasonal abundance are given for some spp. Duck populations in summers of 1949 and 1951 av. about 10-12 individuals per sq. mi., much lower than those of Mackenzie Delta or Peace-Athabaska Delta, but about twice as large as those of the Slave River Parklands.

Stotts, Vernon D. (Md. Game Comm.) BANDING BLACK DUCKS IN MARYLAND. Md. Cons. 34(5): 16-20, 3 photos. Sept. 1957.

Band returns are tabulated and discussed. Females were found to return to the same nesting areas year after year. Few residents fly southward; most travels are n. and e. 75% of resident, breeding adults are shot within 25 mi. of breeding place. 71% of blacks banded in summer and fall are shot in first hunting season. 73% of young are shot in the first hunting season. Of a mixture of residents and migrants banded in winter and spring, 58% are shot within 25 mi. of banding site, 25% are shot on or near n. breeding grounds, and 15% are shot during migration. 71% of blacks banded on wintering grounds are shot during next season. About 7% are caught in traps set for fur animals. Md. shoots its full share of both resident and migrant black ducks.

Weidmann, U. VERHALTENSSTUDIEN AN DER STOCKENTE (ANAS PLATYRHYNCHOS L.). I. DAS AKTIONSSYSTEM. Z. Tierpsych. 13: 208-271. 1956. [From notice by W. C. D., Auk 74(3).]

"An exhaustive description of the fixed action patterns of the Mallard is given. Attention is paid to the activity periods, causal factors, biological significance, and evolution of these patterns."

Wick, Wm. Q., and Harold E. Rogers. (Wash. Dept. Game, Mt. Vernon.) AN UNUSUAL MERGANSER FATALITY. Condor 59(5): 342-343, 1 photo. Sept.-Oct. 1957.

A Mergus merganser choked to death on a Cottus whose spines penetrated the bird's throat. Cascade Lake, Wash., where bird was found, has population consisting mainly of 4 spp. of salmonids. The choked merganser, however, contained only cottids. Other work in Wash. has shown that common mergansers are important predators of trout, especially at hatchery ponds.

Williamson, M. H. (Oxford U., Eng.) POLYMORPHISM IN ROSS'S GOOSE, ANSER ROSSII, AND THE DETECTION OF GENETIC DOMINANCE FROM FIELD DATA. Ibis 99(3): 516-518. July 1957.

Data of Hanson, Queneau, and Scott, 1956, on occurrence of yellow and gray goslings in broods, are studied mathematically in attempt to determine genetic relationship of these colors.

CRANES, RAILS, SHOREBIRDS

Allen, Robert Porter, editor. A REPORT ON THE WHOOPING CRANE'S NORTHERN BREEDING GROUNDS, A SUPPLEMENT TO RESEARCH REPORT NO. 3, THE WHOOPING CRANE. Natl. Aud. Soc., 1130 5th Ave., N. Y. 28, N. Y. 60 p. 1956. $2.50. [From long review by E. R. Kalmbach, J. Wildl. Mgt. 21(3).]

"...tells the story of the nine years' search for the nesting ground (1945-53); its discovery in 1954; the exasperating efforts to reach the area by air, by water, and by land in 1955; a description of the nesting habitat; and an appraisal of the nesting in the area explored in 1955." Breeding population of the area in 1955 was thought to be 20 adults and 8 young. Apparently the species was thinly scattered over its breeding range even in early days. Man's activities reduced the breeding range and hence the population. The present scattering over the known breeding area may be normal for the area. "Appendices include lists of the plants and invertebrates in and near the nesting ponds, and of birds and mammals of the nesting area with ecological notations on them mainly in June along the Little Buffalo River and lower parts of some of the tributaries."

Baggerman, B., G. P. Baerends, H. S. Heikens, and J. H. Mook. OBSERVATIONS ON THE BEHAVIOUR OF THE BLACK TERN, CHLIDONIAS N. NIGER (L.), IN THE BREEDING AREA. Ardea 44: 1-71. 1956. [From notice by R.E.G., Auk 74(3).]

"This fine paper represents the culmination of seven seasons of observation in three different colonies in the Netherlands. A condensed life history is given. Reproductive activities are described and the derivation of each is discussed. An analysis is given of the biological significance of those activities having a signal function. Comparisons with activities of other larids are made throughout."

Behle, Wm. H., and Wayne A. Goates. (U. Utah.) BREEDING BIOLOGY OF THE CALIFORNIA GULL. Condor 59(4): 235-246, 2 graphs. July-Aug. 1957.

100 nests were studied at Great Salt Lake in 1954. Topics discussed are: laying, incubation, clutch size, size of eggs, hatching and nesting success, growth and temperature regulation of young, juvenile mortality, total mortality. "There was a loss of 77 or 30.3 per cent of the young. The total mortality among both eggs and young was 116 or 39.5 per cent. Reproduction success was thus 60.5 per cent."

Conway, Wm. G. (N. Y. Zool. Soc.) THREE DAYS WITH A FAMILY OF WHOOPING CRANES. Animal Kingdom 60(4): 98-106, 6 photos. July-Aug. 1957.

Behavior of adults in caring for eggs and young at New Orleans zoo, 1957.

Glasgow, Leslie L. (La. State U., Baton Rouge 3.) THE NIGHT DRIVING OF COOTS FOR BANDING ON THE WINTERING GROUND OF LOUISIANA. Bird-Banding 28(3): 153-155, 1 fig. July 1957.

Describes methods and equipment and makes following recommendations: "(1) avoid driving coots in vegetation-choked water, (2) place trap in area where coots normally wish to stay, (3) drive down wind during dark of moon, (4) place trap so that coots cannot see it until quite close and (5) keep drivers quiet. It is probable that it would be easier to drive coots during a rain."

Larson, Sten. (Haga Kyrkogata 28A, Göteborg C, Sweden.) THE SUBORDER CHARADRII IN ARCTIC AND BOREAL AREAS DURING THE TERTIARY AND PLEISTOCENE. Acta Vertebratica (Nordiska Museet & Skansen, Stockholm) 1(1): 1-84, 15 maps. 1957. 15 Sw. kr.

The suborder Charadrii consists of several families that include shorebirds and their relatives. Larson has analyzed the present distribution of members of this large group, with consideration of the fossil record. He discusses the

evolution and distribution of taxa from families to subspecies in relation to geographic and climatic changes since the Cretaceous. Glacial barriers and refugia are among factors discussed at length. The paper should be of value to those interested in origins and changes of avifaunas, zoogeography, or relationships and history of groups of the Charadrii. In English.

Leavitt, B. B. (U. Fla., Gainesville.) FOOD OF THE BLACK SKIMMER (RYNCHOPS NIGRA). Auk 74(3): 394. July 1957.
Shrimp and various fishes; Fla.

MacNamara, L. G. (N. J. Div. Game.) IT'S TIME TO HUNT THE RAIL. N. J. Outdoors 8(3): 18-19. Sept. 1957.
Data on trends in numbers of successful nests of clapper rails in N. J. demonstrate that although the trend has been upward since the severe storm tides of 1955, an increase of 47% is still necessary to equal breeding success of 1954. The population is now high enough, however, to provide better hunting than in 1956.

Moynihan, M. SOME ASPECTS OF REPRODUCTIVE BEHAVIOUR IN THE BLACK-HEADED GULL (LARUS RIDIBUNDUS RIDIBUNDUS L.) AND RELATED SPECIES. Behaviour, Suppl. 4: 1-201. 1955. [From notice by F. M., Auk 74(3).]
"A detailed description and analysis of the hostile and sexual behavior patterns. Most attention is devoted to the aerial and ground displays which occur during the period of pair-formation and the causation of these displays is investigated in terms of conflicting attack, escape, and sex drives. The final section compares the displays of other Lari and discusses the classification of the group."

OTHER BIRDS

Anderson, Anders H., and Anne Anderson. (3221 Kleindale Rd., Tucson, Ariz.) LIFE HISTORY OF THE CACTUS WREN. PART I: WINTER AND PRE-NESTING BEHAVIOR. Condor 59(5): 274-296, 7 figs. Sept.-Oct. 1957.
Trapping, habitat, resident status, winter territory, roosting nests, nest construction, voice, pair formation, mating behavior.

Bergman, Göran. SOME VIEWPOINTS RELATING TO THE WHITE-TAILED EAGLE. Sveriges Natur (3): 82-87. 1955. [From abstract by Louise de K. Lawrence, Bird-Banding 28(3).]
In Swedish. There are now only about 70 pairs of Haliaëtus albicilla in Sweden and Finland. Some 100 young a year are produced and winter in s. Scandinavia. "Pressure is now being exercised, primarily by hunters of waterfowl, to decimate this stock further. Presenting strong evidence in support of his views, the author points out that any decline in the present population of eagles would spell catastrophe for the species, that other natural controls would replace them, and that the notion of an increase in waterfowl resulting from the disappearance of the eagles is pure 'wishful thinking, lacking support entirely in experience.'"

Broley, Charles E. THE BALD EAGLE IN FLORIDA. Atlantic Nat. 12(5): 230-231, 2 photos. July-Sept. 1957.
The outlook is far from encouraging. Breeding habitat has been greatly reduced. In 1939, there was a nest nearly every mile along the western coast of Fla. In 1946, a 100-mile strip had 56 nests that produced 103 young. In 1957, the same strip had 7 nests that produced 8 young. Forty-three pairs used nests in the strip in 1957, but only 7 pairs had young--a nesting failure of 86% as compared with 17% in 1946. No eggs were laid in 13 nests. Eggs in 23 nests failed to hatch. High rate of nest failure began in 1952. The birds appear to have become sterile. DDT spraying is a possible explanation; red tide is another. Attention of a research team is required.

Brown, L. EAGLES. Michael Joseph, London. 274 p., 38 photos, 1 map. 1955. 18s. [From review by H.N.S., Ibis 97(4).]

"The author's studies on the natural history of eagles, presented in this book with a pleasant and stimulating admixture of description and adventure, have been concentrated in Scotland and East Africa. Nothing could bring to a sharper focus the differences between these two parts of the world, Scotland having only its single species and East Africa a wealth of nearly a dozen. Valuable as are the observations on territories, food and population of the Golden Eagle, the most interesting part of the book is undoubtedly the attempt to discover how the African eagles can live together in the same area without competing à outrance. Overlaps in type of food taken and in span of breeding season are carefully determined (often only by continued and pertinacious observation) and, if there emerges no picture of subdivision into absolutely clear-cut ecological niches, this does not necessarily mean that we have to think out the results of competition afresh. Rather we must labour even more pertinaciously at amassing field data, so that chance fluctuations in the ecological relationships studied may be smoothed out, or, perhaps, assigned a real place in the balance of animal communities."

Cringan, A. T. (Ont. Dept. Lands & For., Guelph.) NOTES ON THE BIOLOGY OF THE RED-NECKED GREBE IN WESTERN ONTARIO. Can. Field-Nat. 71(2): 72-73. Apr.-June 1957.

Arrival dates, numbers, tabular data on nests and broods observed, nesting density, nesting habitat and its relation to water levels.

Dunnet, George M. (Wildl. Surv. Sec., C.S.I.R.O., Univ. Grounds, Nedlands, W. Australia.) THE BREEDING OF THE STARLING STURNUS VULGARIS IN RELATION TO ITS FOOD SUPPLY. Ibis 97(4): 619-662, 12 figs. Oct. 1955.

Based on research at exp. farm near Aberdeen Scotland, 1950-52, when breeding ?? in a sq. mi. increased from 43 to 78. During breeding, food was mainly from pastures, and from limited number of areas. Cranefly larvae formed more than 80% of food of nestlings; earthworms, although abundant, formed only 16%, and were caught mainly in early a.m. Proportions of different items brought to young did not vary seasonally, although period of peak biomass of cranefly larvae was short. The proportion of available cranefly larvae consumed by nestlings was about 1.9% in 1951 and 7% in 1952. Weights of nestlings did not vary with amount of food available. It was concluded that: "(a) The synchrony of first clutches may be due to the advantage of having successful second broods, and the evidence suggests that these are ultimately controlled by the date the leatherjackets emerge. The synchrony may also have survival value in providing the opportunity for gregarious feeding by the adults and, later, the juveniles. (b) The occurrence of second broods appears to be determined by how early breeding starts and when the leatherjackets disappear from the soil. (c) Breeding-rate and success were not closely related to the available food supply. (d) There is much evidence to suggest that the available food-supply is the ultimate factor timing the end of the breeding season, but it probably does not determine the onset of breeding. (e) The density of the breeding population is not controlled by the food available during the breeding season."

Griscom, Ludlow, and Alexander Sprunt, Jr., editors. THE WARBLERS OF AMERICA. Devin-Adair Co., 23 E. 26th St., N. Y. 10, N. Y. xii + 356 p., 33 col. pl., maps, sketches. 1957. $15.00.

John Henry Dick's 33 good color plates attractively depict all U. S. warblers and 31 spp. of Latin America. The book grew around these plates and shows it in loose organization and diversity of approaches. It is, however, the work of more than a score of well-known ornithologists and it contains a great deal of useful information, some not available elsewhere. Brief introductory chapters discuss classification, study techniques, careful analyses of songs, distribution, and other matters. The bulk of the book takes up warblers of U. S. and Canada by species; a general discussion of each is followed by concise paragraphs on field characters, nests and eggs, voice, foods, and range. In general, these treatments are less detailed than those in Bent. Maps of breeding ranges are supplied for warblers of U. S. and Canada--a valuable feature more bird books should have. Later chapters present narrative accounts of native and migrant warblers in West Indies, Mexico, Central Am., Panama,

and S. Am. These chapters, while not long, are authoritative and discriminative. Four chapters, equally authoritative, tell of status, distribution, and ecology of warbler species in Alaska, B. C., Prairie Provinces, and E. Canada. Appendices give information on classification and Gulf migration routes. References are cited at various points in the book, but there is no bibliography. The index is to birds' names only; it does not cover fully the many sections in which some species are mentioned. In summary, although this book is attractive, informative, partly original, and in large part readable, it is somewhat diffuse and cannot be termed a definitive or encyclopedic reference.

Hagar, Donald C., Jr. (Dept. Zool., U. Calif., Davis.) NESTING POPULATIONS OF RED-TAILED HAWKS AND HORNED OWLS IN CENTRAL NEW YORK STATE. Wilson Bul. 69 (3): 263-272, 1 map. Sept. 1957.

From summary: Studies were made on area of 52 sq. mi. in se. Madison Co. Both hawk and owl strongly tended to use their respective woodlots in successive years. Owls seemed to depend on hawks for nests. Owls seemed restricted to large woodlots with scattered hemlocks more than hawks were. Owls usually nested in beech; hawks nested equally in beech and sugar maple. In spring of 1952, the area had breeding density of 1 pair of horned owls per 4.4 sq. mi. and 1 pair of red-tailed hawks per 2.2 sq. mi. Combined population was 1.4 sq. mi. per pair. Pairs of owls and hawks often had overlapping territories, but if nest sites were closely adjacent, hawks usually abandoned their nests. Hawks fledged 1.9 young per pair, owls 1.7, on av. Brood sizes in 1952 were about 1/2 those of 1951 for both species; cause was not determined.

Jenkin, Penelope M. (Bristol U., Eng.) THE FILTER-FEEDING AND FOOD OF FLAMINGOES (PHOENICOPTERI). Philos. Trans. Roy. Soc. London, Ser. B., 240(674): 401-493, 33 figs. May 1957.

Good comparative study that discusses structural and behavioral adaptations for feeding, types of foods, and relationship of adaptations to ecology and phylogeny of these birds.

Laskey, Amelia R. (1521 Graybar Lane, Nashville, Tenn.) SOME TUFTED TITMOUSE LIFE HISTORY. Bird-Banding 28(3): 135-145. July 1957.

Age, habits, bathing, song, feeding of female, nesting, incubation, nestling period, weights.

Phillips, Richard E., and Glen D. Carter. (Cornell U.) WINTER FOOD OF WESTERN GREBES. Murrelet 38(1): 5-6. Jan.-Apr. [Aug.] 1957.

Salmon fishermen were killing western grebes entangled in nets on belief that these birds were eating many young salmon. Authors examined stomach contents of 7 ♂♂ collected near Eliza Is., Wash., in Feb. and Mar. 1952. They contained herring, sea-perch, cod-like fish, blennies, and sculpin-like fishes. No remains of salmonids were found. Weights of 13 grebes were heavier than sometimes reported; they ranged from 1 lb. 12 oz. to 4 lbs. and av. 3 lbs. 4 oz. All stomachs contained feather balls, and most contained many nematodes. All intestines had tapeworms, sometimes large masses of them.

Summers-Smith, D. MORTALITY OF THE HOUSE SPARROW. Bird Study 3(4): 265-270. 1956. [From review by O. L. Austin, Jr., Bird-Banding 28(3).]

Analysis of B. T. O. returns shows the annual mortality in Passer domesticus to be 70% in the first year and to av. 42% in subsequent years. This is considerably lower than the av. annual adult mortality demonstrated for other small passerines. This may reflect constancy of food supply and sedentary habits. 54% of adult deaths occur during breeding season and the other 46% are divided almost equally between the other two 4-month periods. Main reason for high mortality during breeding is believed to be increased predation and the effort of rearing successive broods.

Watson, Adam. (U. Aberdeen, Scotland.) THE BEHAVIOUR, BREEDING, AND FOOD-ECOLOGY OF THE SNOWY OWL NYCTEA SCANDIACA. Ibis 99(3): 419-462, 8 figs. July 1957.

Long paper based on work on Baffin Is. in 1953 and on extensive literature. Discusses flight, hunting, voice, reactions of passerines to owls, interspecific reactions, reactions to man, displays, displacement activities, eating, drinking, incubation behavior, behavior of young, breeding habitat, breeding density,

territorial relationships, nests, breeding season, clutch size, eggs, incubation period, growth and development of young, breeding success, food depots, availability of food, rate of pellet production, relation of pellet contents to food eaten, food consumption of young and adults, and proportion of the lemming population eaten. The owls were confined to wet lowland areas where lemmings were abundant. Their density and breeding capacity were closely correlated with lemming density. Territories varied in size from 0.5 to 3 or 4 sq. mi. Each young, while in nest, ate an av. of about 2 full-grown lemmings a day. Adults ate 3-5 per day. Lemming density was estimated as about 20 per acre in early July and 130 per acre in mid-Aug. Proportion of lemmings taken by owls during season was 8% to 20% of biomass in mid-Aug. and 20% to 31% of the numbers in early July. As lemming population was in constant turnover and increasing, real effect of predation was less than if these proportions had died all at one time. Daily take of 3 adults in mid-June was less than 0.1% of lemmings in their territories. In Aug., daily take of 3 adults and 15 young was less than 0.2% of available population.

REPTILES AND AMPHIBIANS

Bullock, Theodore H., and Wade Fox. (U. Calif., Los Angeles.) THE ANATOMY OF THE INFRA-RED SENSE ORGAN IN THE FACIAL PIT OF PIT VIPERS. Quart. J. Micros. Sci. 98(2): 219-234, 2 figs. + 4 pl. June 1957.
Includes data on function and adaptation.

Cagle, Fred R. (Tulane U.) IS TURTLE DESTROYER OF FISH AND GAME? La. Cons. 9(7): 2-3, 24, 3 photos. July-Aug. 1957.
Reviews various studies on foods and feeding habits of turtles of e. U. S. Some aquatic turtles such as sliders, feed mainly on aquatic and terrestrial vegetation. Snappers eat fish among other things, but since their feeding depends on availability, most of their fish are rough fish. Obviously, turtles do not harm fish populations. When numerous, turtles may do some good or harm by eating large amounts of aquatic vegetation. Box turtles destroy few eggs of game birds and are unable to break into eggs larger than those of quail. Tests show that they eat shells of broken eggs rather than contents. Some reports of box turtle predation on quail eggs probably represent observations of these turtles eating shells of eggs broken by other agents.

Carpenter, Charles C. (U. Okla., Norman.) HIBERNATION, HIBERNACULA AND ASSOCIATED BEHAVIOR OF THE THREE-TOED BOX TURTLE (TERRAPENE CAROLINA TRIUNGUIS). Copeia 1957(4): 278-282, 1 graph. Dec. 1957.

Carr, Archie, and John W. Crenshaw, Jr. (U. Fla.) A TAXONOMIC REAPPRAISAL OF THE TURTLE PSEUDEMYS ALABAMENSIS BAUR. Bul. Fla. State Mus., Biol. Sci. 2(3): 25-42, 4 figs. Aug. 1957.
Study of economically important and taxonomically confusing group of turtles. "In the light of new criteria we propose the rehabilitation of Pseudemys alabamensis as a member of the turtle fauna of coastal areas of Alabama, Louisiana, and northwestern Florida, and perhaps of eastern Texas. Through one contiguous or sympatric relative or another, alabamensis appears to intergrade with stocks of both the rubriventris and the floridana groups."

Cooper, John E. (Nat. Hist. Soc. Md., 2101 Bolton St., Balt. 17, Md.) AN ANNOTATED LIST OF THE AMPHIBIANS AND REPTILES OF ANNE ARUNDEL COUNTY, MARYLAND. Md. Naturalist 26(1-4): 16-23, 4 figs. 1956 [Sept. 1957.].
Locality records and notes on abundance and habitats.

Curry-Lindahl, Kai. (Nordiska Museet & Skansen, Stockholm.) BEHAVIOUR OF THE TROPICAL ROCK LIZARD AGAMA CYANOGASTER (RUPPEL) IN HOT ENVIRONMENTS. Ann. Soc. Roy. Zool. Belg. 87(1): 45-74, 7 figs. 1956-57.
Gives good review of literature on thermal tolerance and heat regulation of reptiles, with special reference to behavior and significance of coloration of A. cyanogaster on light and dark substrata in Belgian Congo.

Dowling, Herndon G. (U. Ark., Fayetteville.) A REVIEW OF THE AMPHIBIANS AND REPTILES OF ARKANSAS. U. Ark. Mus., Occ. Pap. no. 3. 1-51 p., 1 map. July 1957.
Annotated catalog with list of localities for each species. Instate distribution of each species is discussed briefly, with mention of subspecies present in state. Previous errors, taxonomic changes necessitated by recent publications, and unsettled questions are pointed out. Directions for preserving specimens, lists of references, and a checklist complete the booklet.

Duellman, Wm. Edward. THE PHYLOGENETIC RELATIONSHIPS AND ZOOGEOGRAPHY OF THE SNAKES OF THE GENUS LEPTODEIRA. Ph.D. thesis, U. Mich. 310 p. 1956. [From abstract in Dissertation Abstracts 17(6).]
Study of variation, taxonomy, and distributional history.

Goin, Coleman J., and Olive B. Goin. (U. Fla.) REMARKS ON THE BEHAVIOR OF THE SQUIRREL TREEFROG, HYLA SQUIRELLA. Ann. Carnegie Mus. 35: 27-36, 1 graph. 1957.
Observations were made at Gainesville, Fla., in a yard nearly surrounded by mesic hammock. Data were obtained on seasonal changes in numbers and resting places, and reactions to temperatures.

Gould, Edwin. (475 Longview Rd., S. Orange, N. J.) ORIENTATION IN BOX TURTLES, TERRAPENE C. CAROLINA (LINNAEUS). Biol. Bul. 112(3): 336-348, 5 figs. June 1957.
Experimental evidence that box turtles are able to orient toward home by means of sun position. Orientation was poor when sky was overcast and when mirror was used to misguide turtle as to sun's position.

Hansen, Keith L. (Stetson U., Deland, Fla.) MOVEMENTS, AREA OF ACTIVITY, AND GROWTH OF RANA HECKSCHERI. Copeia 1957(4): 274-277, 4 figs. Dec. 1957.

Jameson, David L. (U. Ore.) POPULATION STRUCTURE AND HOMING RESPONSE IN THE PACIFIC TREE FROG. Copeia 1957(3): 221-228. Aug. 1957.

Legler, John M., and Henry S. Fitch. (U. Kans., Lawrence.) OBSERVATIONS ON HIBERNATION AND NESTS OF THE COLLARED LIZARD, CROTAPHYTUS COLLARIS. Copeia 1957(4): 305-307, 1 pl. Dec. 1957.

Leopold, R. S., G. S. Huber, and R. H. Kathan. (Naval Med. Field Res. Lab., Camp Lejeune, N. C.) AN EVALUATION OF THE MECHANICAL TREATMENT OF SNAKE BITE. Military Med. 120(6): 414-416. June 1957.
"Rabbits (84) were injected with Crotalus adamanteus venom (approx 4 mg/kg body wt) and treated in four different ways: immobilization; immobilization and tourniquet; immobilization, incision and suction; and simple return to cage. Results indicate rabbits live longest when immobilization with or without tourniquet is used; the use of incision and suction with immobilization shortens the time to death and is contraindicated. Rabbits injected and returned to cages immediately lived the shortest length of time and served as experimental blanks." [The test of incision and suction seems hardly to the point. Venom was injected into the thigh, only 1 incision was made, and suction was applied only 15 minutes. With people, most bites are on extremities, incision is multiple, and suction is long and repeated. This and other recent papers demonstrate that current views on treating snake bite are so opposed that the situation is chaotic. Nonspecialists are in no position to make even first-aid recommendations.]

Manville, Richard H. (151 Ossining Rd., Pleasantville, N. Y.) AMPHIBIANS AND REPTILES OF GLACIER NATIONAL PARK, MONTANA. Copeia 1957(4): 308-309. Dec. 1957.

Martof, Bernard S., and Donald C. Scott. (U. Ga.) THE FOOD OF THE SALAMANDER LEUROGNATHUS. Ecology 38(3): 494-501, 2 graphs. July 1957.

Minton, Sherman A., Jr. (Ind. U. Med. Center, Indianapolis.) VARIATION IN YIELD AND TOXICITY OF VENOM FROM A RATTLESNAKE (CROTALUS ATROX). Copeia 1957 (4): 265-268, 2 graphs. Dec. 1957.

Mosimann, James Emile. A MORPHOMETRIC ANALYSIS OF ALLOMETRY IN SHELLS OF THE TURTLES: GRAPTEMYS GEOGRAPHICA, CHRYSEMYS PICTA, AND STERNOTHERUS ODORATUS. Ph.D. thesis, U. Mich. 162 p. 1956. [From long abstract in Dissertation Abstracts 17(6).]

Nero, Robert W. (Sask. Mus. Nat. Hist., Regina.) OBSERVATIONS AT A GARTER SNAKE HIBERNACULUM. Blue Jay 15(3): 116-118, 4 photos. Sept. 1957.
Activities of hundreds of T. sirtalis parietalis seen April 29, 1957 at cracked shale bank near Estevan, Sask. [The large snakes, centers of group attention, probably were not ♂♂, but ♀♀ followed by courting ♂♂.]

Parrish, Henry M. (U. Pittsburgh Grad. Sch. Pub. Health.) MORTALITY FROM SNAKEBITES, UNITED STATES, 1950-54. Pub. Health Rep. 72(11): 1027-1030, 1 photo. Nov. 1957.
A list of the 71 deaths from snakebite in the 5-year period was obtained from Natl. Office of Vital Statistics. Further data were obtained from 53 officers that signed death certificates. There were about 14 deaths a year from snakebite in U. S., or 0.09 per million. Death rates were highest in Ariz., Fla., Ga., Texas, and Ala. Fifty-three of the 71 victims were ♂♂. 39% of deaths were in persons under 15 years of age, 32% in persons of 50 or more. Outdoor workers had highest incidence of fatal bites. Only 2 of the 71 people were bitten while engaged in recreation, which makes sportsmen seem relatively safe. Bites were commonest in summer. Most of the bites were by rattlesnakes. No death was attributed to a copperhead. About half the bites were on lower extremities and 37% on upper extremities. Time between bite and death varied widely, but in half of patients was 6-18 hours. Many patients were not treated soon enough. Prompt and vigorous treatment is important.

Pope, Clifford H. REPTILES ROUND THE WORLD. A SIMPLIFIED NATURAL HISTORY OF THE SNAKES, LIZARDS, TURTLES, & CROCODILES. Knopf, N. Y. xv + 194 + x p., Illus. 1957. $3.50.
A natural history of reptiles of the world written for youngsters of about teen age. Like all of Pope's work, it is accurate, is not sensationalized, and is of real reference value. The many illustrations are interesting pencil drawings by Helen Tee-Van. The first and larger part of the book is primarily on biology of reptiles. Here are discussed such topics as eating, reproducing, size, growth, age, defense, reptiles as pets, and usefulness to man. The reader learns how snakes crawl, how the alligator snapping turtle uses its "worm" for bait, how the alligator makes its nest, how much the largest reptiles weigh, how fast a chameleon grows and how soon it dies, how snakes bluff, when reptiles ruled the earth, how snakes bite, how to keep reptilian pets, what the place of reptiles is in religion, and many other things. The second part is a survey of reptiles of each continent. Outstanding species are mentioned, but much of the discussion deals with zoogeography and adaptations of families, although such technical terms are not used. The book contains much interesting and worthwhile information. As a simplified survey of reptilian natural history, it would be hard to surpass. The reviewer wonders, however, how attractive to young people any book can be that passes so rapidly from topic to topic and from animal to animal. In other words, how serious is lack of continuity in a book that is intended to be read? The book closes with an index and a list of technical names of animals mentioned in the text.

Ralph, Charles L. (Ent. Branch, Directorate of Med. Res., Army Chem. Center, Md.) A DIURNAL ACTIVITY RHYTHM IN PLETHODON CINEREUS AND ITS MODIFICATION BY AN INFLUENCE HAVING A LUNAR FREQUENCY. Biol. Bul. 113(1): 188-197, 3 graphs. Aug. 1957.

Reed, Clyde F. (10105 Harford Rd., Balt. 34, Md.) CONTRIBUTIONS TO THE HERPETOLOGY OF MARYLAND AND DELMARVA, 15: THE HERPETOFAUNA OF SOMERSET COUNTY, MD. J. Wash. Acad. Sci. 47(4): 127-128. Apr. 1957.
List with localities.

Schmidt, Karl P., and Robert F. Inger. (Chicago Nat. Hist. Mus.) LIVING REPTILES OF THE WORLD. Hanover House, Garden City, N. Y. 287 p., 266 illus., including 145 in color. 1957. $10.00.

One of the most outstanding and attractive nature books of the year. The numerous color photos are magnificent and the black-and-white photos are excellent; all are large and almost all are sharp. Perhaps no other reptile book is as beautifully illustrated. Many skilled photographers contributed to the book and the printers did well by them. People of all ages and types will be fascinated by the illustrations, so the book is a prime choice for public and technical libraries. The text, by 2 widely experienced authorities, is semi-technical in level, more suited to the proverbial "intelligent layman" and the naturalist than to youngsters. It is of high accuracy and will be used by professionals for certain purposes. The large, 2-column pages provide space for a surprising amount of text and the space has been well used. One is continually surprised how much information the authors have presented. The book is not for identification, of course, for relatively few species could be depicted or discussed in 1 volume, but a gratifyingly large number of species is treated. Organization is primarily by families, but under a family the organization is partly geographic and partly systematic. Information ranges over natural history, distribution, zoogeography, foods, reproduction, and adaptations. No space is wasted on tiresome descriptions. Material is presented as interestingly as could be expected in a serious survey of a large group. The book has an index and is pleasingly bound and well produced.

Schöttler, W. H. A. (Inst. Butantan, São Paulo.) LISTA SUPLEMENTAR DE BIBLIOGRAFIA SÔBRE VENENOS ANIMAIS PUBLICADA NOS ANOS DE 1863 ATÉ 1946. [Supplementary list of bibliography on animal venoms published from 1863 to 1946.] Mem. Inst. Butantan 26: 7-73. 1954. [From Biol. Abs. 31(10).]

"This is intended as a supplement to the 'Bibliography of Animal Venoms' published by R. W. Harmon and C. B. Pollard (U. Fla. Press, Gainesville, Fla.) in 1948. About 1200 references have been added. The author points out the desirability of having some kind of bibliographic center where photostatic reproductions would be kept and copies made available."

Shaw, Charles E. (P. O. Box 551, San Diego 12, Calif.) LONGEVITY OF SNAKES IN CAPTIVITY IN THE UNITED STATES AS OF JANUARY 1, 1957. Copeia 1957(4): 310. Dec. 1957.

Stahnke, H. L., F. M. Allen, R. V. Horan, and J. M. Tenery. (Ariz. State Coll., Tempe.) THE TREATMENT OF SNAKE BITE. Am. J. Tropical Med. & Hyg. 6(2): 323-335, 8 photos. Mar. 1957.

Since deaths from snake bite in U. S. number only about 10-20 a year, "Tissue destruction, not death, is stressed as the major medical problem... Case histories are presented contrasting the effects of pit-viper bite when treated with or without cryotherapy. A seven-step regimen to prevent death and tissue destruction through the use of ligature and cryotherapy is presented. Emphasis is placed on the importance of using iced water initially, followed by a complete and continuous coverage of the envenomed member with finely divided ice. It is also stressed that success in the use of cryotherapy is dependent upon a careful consideration of the ambient temperature. Supporting therapy is also suggested stressing the following: (a) a more effective and conservative use of incision and suction; (b) the possibilities of increased tissue destruction by the improper use of antivenin; (c) a warning against utter disregard of the principle of chemical compatibility when selecting supporting therapeutic agents. A documented discussion of the wide margin of safety involved when using cryotherapy and the value of the ligature are given in conclusion."

Tanner, Wilmer W., and Richard E. Loomis. (Brig. Young U., Provo, Utah.) A TAXONOMIC AND DISTRIBUTIONAL STUDY OF THE WESTERN SUBSPECIES OF THE MILK SNAKE, LAMPROPELTIS DOLIATA. Trans. Kans. Acad. Sci. 60(1): 12-42, 4 figs. 1957.

Four new or revived ssp. are described, their ranges are mapped, relationships of the group are discussed, and a key is given for all ssp. of milk snakes in U. S. and n. Mexico.

Tashian, Richard E., and Carleton Ray. (1135 E. Catherine St., Ann Arbor, Mich.) THE RELATION OF OXYGEN CONSUMPTION TO TEMPERATURE IN SOME TROPICAL, TEMPERATE AND BOREAL ANURAN AMPHIBIANS. Zoologica 42(2): 63-68, 2 graphs. Aug. 1957.

Thomas, Erhard. INVESTIGATIONS ON THE BRIGHTNESS AND COLOR SENSE IN THE ANURA. Zool. Jahrb. Abt. allg. Zool. u. Physiol. Tiere 66(1): 129-178, illus. 1955. [From Biol. Abs. 31(9).]

In German. "A well-developed color vision is ascribed to Rana esculenta, pipiens, clamitans, and Bombina bombina, whereas color vision is lacking in the Bufonidae, Pelobatidae, and the leptodactylid Adelotus brevis. This accords with habits as forms with nocturnal habits lack color vision while those active by day possess it."--From long abstract by L. H. Hyman.

Volpe, E. Peter. (Newcomb Coll., Tulane U., New Orleans, La.) THE EARLY DEVELOPMENT OF RANA CAPITO SEVOSA. Tulane Studies in Zool. 5(9): 207-225, 16 figs. Sept. 1957.

Wright, A. H., and Anna A. Wright. (Cornell U.) HANDBOOK OF SNAKES OF THE UNITED STATES AND CANADA. Cornell U. Press. 2 vols. xxvii + 1105 p., 305 figs., 70 maps. 1957. $14.75.

Far and away the most comprehensive work on snakes of Am. n. of Mexico. Except for some general, introductory information, it is devoted to accounts of species and subspecies. Accounts take up common names, range, size, coloration, habitats and habits, breeding, foods, selected references, and notes. There are keys to all groups. A range map is given for each form. A series of small photographs for each form show head, section of body, undersurface, and back. Line drawings of heads and other features illustrate glossary and keys to families and genera. Many of the maps are good, depending in part on the source. Photographs are good but small. Drawings vary in accuracy. Text contains much good information and will be used heavily for quick reference and as a guide to technical literature. It is, however, too uncritical and nonquantitative to be of great value to professionals. It is too confusing for the beginner because it includes much poorly digested material. It is padded with poorly selected material and with lengthy color descriptions of individual specimens. Even the keys are padded, presumably in an attempt to keep structural and quantitative data out of the text. It must be emphasized, however, that despite these weaknesses the book contains more information on and more illustrations of our snakes than any other one work. Only 4 pages of references are provided, as vol. 3 will consist of the detailed bibliography.

FISHES

Koster, Wm. J. (U. of N. M.) GUIDE TO THE FISHES OF NEW MEXICO. U. of N. M. Press (Albuquerque) in cooperation with N. M. Dept. Game & Fish. vii + 116 p., 104 outline drawings. 1957. $1.00, paper.

An authoritative but popular and to some extent preliminary handbook. The author is a professional ichthyologist who has done extensive field work in N. M. The book includes all species and gives much useful information, but is designed primarily for nontechnical use. Introductory sections outline the biology of fishes, tell what anglers should do to maintain fishing, and tell how to identify and preserve fishes. In place of keys there are outline drawings and accompanying brief characterizations that aid in identifying families and species. Species accounts are readable. They give comparative descriptions, tell of distribution in state, outline habits and life history, and briefly discuss economic and angling importance, sometimes with mention of angling techniques. Subspecies are mentioned where necessary. The book includes short glossary, index to common and scientific names, and list of selected references. It should serve its purpose well in helping naturalists and anglers identify their catches and in answering many common questions about local fishes.

Trautman, Milton B. (Ohio State U.) THE FISHES OF OHIO. Ohio State U. Press (Columbus) in collaboration with Ohio Div. Wildl. xviii + 683 p., 174 figs., 183 maps, 7 col. pl. 1957. $6.50, cloth.

An extremely valuable, authoritative book based on extensive surveys and many years of meticulous work. Although one of our finest state faunas, it is written so as to be useful to amateur or professional. Introductory sections explain the geological and physiographic bases of present fish distribution in Ohio, ecological changes in historical times, factors affecting distribution and abundance, introductions, nomenclatorial matters, hybridization, and how to use the keys. The keys are carefully prepared, detailed, and dichotomous. Their use is well explained and there is a good glossary and explanation of characters. Species accounts comprise most of the book. Each has one or more good drawings of the species, a detailed distribution map for Ohio, and a small map of total range in N. Am. Texts of species accounts do not contain long, labored descriptions but stress important characters and comparisons. They also discuss reasons for changes in status and distribution in Ohio, and describe the habitats of the species. Where appropriate, they mention economic importance and population fluctuations. The 7 color plates illustrate 21 species attractively. Long bibliography and fine index complete the volume. The price is extremely reasonable for such a large and fully illustrated work. The book should be in every library of ichthyology, fisheries biology, or natural history.

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AUTHOR INDEX

	Page		Page
Abrahamsen, Norman S. B.	29	Bergman, Göran	73
Agee, C. Phillip	60	Berryman, Jack H.	15
Ahlgren, C. E.	24	Bigland, C. H.	59
Albertson, F. W.	23	Birch, L. C.	11
Albrecht, Wm. A.	2	Blair, A. P.	7
Alfonso, Pablo	30	Blair, W. F.	7
Allen, F. M.	79	Blydenstein, John	22
Allen, Ken	39	Bohl, Wayne H.	65
Allen, Robert Porter	72	Bolton, W. D.	45
Allred, B. W.	21	Bonner, James	2
Ammann, G. A.	65	Booker, T. A.	46
Anderson, Anders H.	73	Borell, A. E.	14
Anderson, Anne	73	Boyd, Hugh	69,71
Anderson, C. H.	24	Bramble, W. C.	27
Anderson, Kling L.	22	Brandborg, Stewart M.	3
Appelman, F. J.	9	Breitung, August J.	5
Arata, Andrew A.	27	Brodkorb, Pierce	7
Ashley, Laurence M.	36	Broley, Charles E.	73
Baerends, G. P.	72	Bromley, A. W.	14
Baggerman, B.	72	Bronson, Franklin Herbert	33
Bailey, Virginia Long	5	Brooks, D. M.	42
Balser, D. S.	44	Brooks, F. A.	14
Banasiak, Chester F.	46	Brown, Clair A.	5
Barber, Albert A.	30	Brown, Harrison	2
Barnett, Edward M.	38	Brown, L.	74
Beatley, Janice C.	5	Brown, S. G.	49
Becking, Rudy W.	4	Bruns, Herbert	57
Beckwith, Stephen L.	38	Bubenik, Antonin	46
Beeman, Robert D.	44	Buckland, W. R.	12
Beer, James R.	35	Bullock, Theodore H.	76
Behle, Wm. H.	72	Burns, Lucile M.	51
Belopolsky, L. O.	52	Burns, R. K.	51
Belt, Charles Banks	3	Burns, Russell M.	33
Berezina, N. A.	10	Burt, Wm. H.	29

Page

Byrd, Mitchell A. 12
Byrnes, W. R. 27
Cagle, Fred R. 7,76
Callaway, Lynn 47
Campbell, Bruce 58
Campbell, Howard 64
Carlson, Floyd Everett 3
Carpenter, Charles C. 76
Carr, Archie 76
Carson, Jim 38
Carter, Glen D. 75
Chamberlain, R. W. 60
Champion, Boyd 8
Chew, Robert M. 28
Chiasson, Robert B. 49
Childs, John A. 37
Ching, Kim Kwong 24
Christman, Gene M. 53
Cloutier, R. J. 32
Collier, Eric 41
Comfort, A. 28
Connell, Robert 31
Conway, Wm. G. 72
Cooch, Graham 69
Cook, David B. 25
Coombs, C. J. F. 53
Cooper, John E. 76
Corner, A. H. 31
Cowan, I. McT. 41,52
Craine, Lyle Eggleston 3
Crenshaw, John W., Jr. 76
Cringan, A. T. 74
Crissey, W. F. 69
Cruickshank, Allan D. 13
Curry-Lindahl, Kai 76
Curtis, John T. 21
Czarnecki, Zygmunt 58
Dansereau, Pierre 7
Darsie, Richard F., Jr. 18
Dasmann, Raymond 8
Davidson, Robert Austin 5
Davies, J. L. 49
Davis, David E. 30
Davis, John 58
Davison, Verne E. 15
Day, G. I. 22
DeBoer, Stanley G. 47
Delap, Peter 45
Denniston, Rollin H., II. 38
de Vos, Antoon 42
DeWitt, James B. 10
Dick, James 26
Dickey, Charles H. 16
Dimock, Edward J., II. 26
Disney, H. J. deS. 54
Doll, A. D. 44
Dorney, Robert S. 66
Dowling, Herndon G. 77
Draney, Virgil 40
Dubicka, Halina 51
Duellman, Wm. Edward 77
Dunbar, M. J. 49
Dunnet, George M. 33,74
Durand, JoAnn 40
Durell, James S. 60,61

Page

Durrell, W. B. 45
Durup, Henri 35
Dykes, F. C. 21
Dyksterhuis, E. J. 22
Edwards, Malcolm G. 66
Edwards, R. Y. 14,41,45
Edwards, Wm. R. 68
Egler, Frank E. 27
Elliot, C. H. 24
Ellis, Derek V. 30
Emlen, John T., Jr. 30
Ensminger, Allan B. 10
Evans, Raymond A. 22
Fant, R. J. 64
Fenner, Frank 33
Ferens, Bronislaw 51
Fertig, S. N. 28
Finlay, Peter Stevenson 60
Fisher, H. D. 50
Fitch, Henry S. 77
Flint, V. E. 69
Folk, G. E., Jr. 29
Fowle, C. D. 14
Fox, Wade 76
Freeland Forrest Dean, Jr. 24
French, C. E. 16
Frenzel, Louis D. 35
Frith, H. J. 69
Fuller, William A. 30
Gates, Robert L. 37
Gee, E. P. 9
Gelineo, S. 53
Georg, Lucille K. 31
Gibb, John 51,53
Gibbs, H. C. 31
Gier, H. T. 43
Gill, John D. 47
Gilman, Elizabeth M. 5
Gladkina, T. S. 39
Glasgow, Leslie L. 72
Goates, Wayne A. 72
Goin, Coleman J. 77
Goin, Olive B. 77
Goodwin, D. 68
Gould, Edwin 77
Graber, Jean W. 56
Graber, R. R. 56
Graf, Wm. 45
Green, Houston 67
Greenwald, Gilbert S. 35
Greer, Kenneth R. 43
Greer, Wm. E. 48
Griffin, D. R. 32
Griscom, Ludlow 74
Grondahl, C. R. 64
Grove, Alvin R. 42
Gruzdev, V. V. 58
Gullion, Gordon W. 66
Gysel, Leslie W. 26
Haartman, L. von 70
Haas, Glenn Edward 33
Hagar, Donald C., Jr. 75
Hall, J. S. 32
Halloran, Arthur F. 46
Hamilton, Wm. J., Jr. 25

Page

Handley, Rolland B. 68
Hankla, Donald J. 21
Hanks, R. J. 22
Hanlon, Robert W. 17
Hansen, H. L. 24
Hansen, Keith L. 77
Hansen, Richard M. 35
Hardy, A. V. 32
Harrington, Lyn 70
Harris, Stanley Warren 19,64
Harris, Van T. 40
Hart, Chester M. 13,64
Hart, J. S. 50
Hart, John Fraser 33
Hartkorn, Fred L. 66
Hartley, P. H. T. 51
Haugen, Arnold O. 48,61
Hayes, F. A. 48
Hazel, Robert B. 21
Heezen, Bruce C. 49
Heikens, H. S. 72
Hibbard, Edmund A. 43
Hickey, J. J. 13
Hine, Ruth L. 30
Hinegardner, Ralph T. 28
Hitchcock, Harold B. 32
Hodgkins, Earl Joseph 24
Hoff, C. Clayton 24
Holbrook, Herman L. 67
Holdenried, R. 35
Holzer, Frederick V. 66
Homes, R. C. 55
Horan, R. V. 79
Horsfall, Frank, Jr. 36
Hovind, Ralph B. 48
Howard, Walter E. 22
Hoy, Wm. E. 6
Hubbs, Carl L. 50
Huber, G. S. 77
Huber, J. 53
Hudson, Bee 19
Hudson, M. S. 19
Hugghins, Ernest J. 60
Hume, Charles 43
Humphrey, Philip S. 70
Humphrey, R. R. 4,22
Hungerford, C. R. 22
Huth, Hans 4
Inger, Robert F. 79
Irving, Laurence 29,50
Iushchenko, G. V. 37
Ivens, Virginia 31
Jameson, David L. 77
Jenkin, Penelope M. 75
Jennings, Wm. L. 32
Johnson, Ancel Meringus 34
Johnson, John Cristopher, Jr. 55
Johnson, John Irwin 42
Johnston, A. 22
Jones, J. Knox, Jr. 30
Kartman, Leo 37
Kathan, R. H. 77
Kay, Burgess L. 22
Keener, John M. 48
Kelting, Ralph W. 23

Page

Kendall, M. G. 12
Kent, Fred W. 13
Kipp, Friedrich A. 61
Kirkpatrick, Charles M. 38
Kissling, R. E. 60
Klimstra, Willard D. 61
Klopfer, Peter H. 70
Klumov, S. K. 50
Kondo, Hideaki 34
Korschgen, Leroy J. 17
Koster, Wm. J. 80
Kozicky, Edward L. 62
Kozlov, V. V. 70
Kramer, G. 53
Kruidenier, F. J. 31
Krumholz, Louis A. 13
Kurz, Herman 19
Kuzmina, M. A. 66
Lack, David 53
LaFave, Lynn D. 59
Laffoday, Samuel Kanada 35
Lanyon, Wesley E. 53
Larrison, Earl J. 8
Larson, Sten 72
Laskey, Amelia R. 75
Lawrence, Wm. H. 26,36
Laws, R. M. 50
Leavitt, B. B. 73
Lee, James A. 48
Legler, John M. 77
Leisman, Gilbert A. 27
Lemke, C. W. 66
Lemmon, Paul E. 13
Leonard, O. A. 28
Leonard, Warren H. 2
Leopold, R. S. 77
Levine, N. D. 31
Lewis, A. L. 32
Likhachev, A. I. 46
Links, J. G. 41
Liscinsky, S. A. 16
Lonergan, Richard P. 37
Longhurst, Wm. M. 23
Loomis, Richard E. 79
Lorenz, R. J. 23
Lotti, Thomas 28
Love, G. J. 31
Love, R. Merton 22
Loveless, Charles M. 20
Low, Seth H. 52
Lubinsky, George 31
Luckmann, Wm. H. 38
Lumsden, H. G. 70
Lundgren, D. L. 31,44
MacArthur, R. H. 52
Mackay, R. H. 70
MacLeod, Charles F. 35
Mac Lulich, D. A. 11
MacNamara, L. G. 73
Malin, James C. 23
Manson, Philip W. 20
Manville, Richard H. 46,77
Marchette, N. J. 31,44
Marshall, A. J. 53,54
Marshall, Joe T., Jr. 56

	Page
Martof, Bernard S.	77
Matthews, J. D.	25
McCullough, Robert A.	49
McEwen, Eoin H.	44,56
McLean, A.	6
Menges, R. W.	31
Miller, D. R.	16
Minton, Sherman A., Jr.	77
Mohr, Carl O.	37
Mook, J. H.	72
Moore, G. A.	7
Moore, Joseph Curtis	38
Moore, Wm. H.	25
Morris, R. F.	11
Morse, Wm. B.	68
Mosby, H. S.	62
Mosimann, James Emile	78
Moyle, John B.	20
Moynihan, M.	73
Muncy, Robert J.	12
Munro, J. A.	56
Murie, Olaus J.	44
Mykytowycz, R.	34
Myres, M. T.	52,54
Nakamura, Katsuya	34
Naumov, N. P.	30
Nelson, Thomas C.	25
Nero, Robert W.	78
Newberne, J. W.	42
Nibley, Carlyle, Jr.	60
Nice, Margaret Morse	54
Nichols, Lewis G.	10
Nielson, Errol	46
Owen, D. F.	53
Pacy, James S.	3
Page, C. A.	40
Paludan, K.	67
Parmelee, David Freeland	54
Parrish, Henry M.	78
Pavlansky, Rudolph	46
Penttila, Harte E.	21,40
Perevalov, A. A.	34
Peters, Harold S.	68
Pettingill, O. S., Jr.	56
Phillips, Richard E.	75
Poliakov, I. Ia	39
Poole, John B.	32
Pope, Clifford H.	78
Pratt, J. G.	53
Przybyla, Stefan	51
Ralph, Charles L.	78
Rate, Henry	70
Ray, Carleton	80
Ray, Hurlon	28
Reed, Clyde F.	78
Reeves, J. H.	62
Reynolds, Hudson G.	23,36
Richardson, Frank	54
Richdale, L. E.	59
Riedesel, M. L.	29
Ripley, Thomas H.	62
Ritchie, J. C.	6
Robinson, Thane S.	62
Robinson, V. B.	42
Rogers, Harold E.	71
Rogler, G. A.	23
Rollin, Noble	71
Rollins, H. A., Jr.	36
Rowley, Ian	34
Sampson, Frank	44
Sanderson, Ivan T.	50
Sandfort, Wayne W.	67
Scatterday, J. E.	32
Schmidt, Karl P.	79
Schmidt-Nielsen, Knut	29
Schneider, N. J.	32
Schöttler, W. H. A.	79
Schreiber, M. M.	28
Schultz, H. B.	14
Schultz, Vincent	12,39
Schütte, F.	17
Scott, Alexander	44
Scott, Donald C.	77
Scott, Peter	71
Scott, Thomas G.	61
Selleck, David M.	13
Sergeant, D. E.	50
Serventy, D. L.	52,54
Seubert, John Lyman	65
Shaw, Charles E.	79
Shotts, E. B.	48
Shvetsov, IU. G.	36
Silver, Helenette	15
Smart, K. L.	31,44
Smith, Arthur D.	49
Smith, Wm. W.	31,37
Snow, J. R.	20
Snyder, L. L.	56
Sokolowski, Jan	51
Soper, J. Dewey	71
Speake, Daniel W.	48,61
Springer, Paul F.	18
Sprunt, Alexander, Jr.	74
Stahnke, H. L.	79
Stamm, D. D.	60
Stanford, Jack A.	63
Stefferud, Alfred	2
Stelfox, H. B.	23
Stephens, T. C.	52
Stickel, Lucille F.	4
Stotts, Vernon D.	71
Stratton, G. Burder	4
Sudia, W. D.	60
Summers-Smith, D.	75
Svärdson, Gunnar	11
Swena, Richard	36
Swenson, W. S.	21
Swindale, Delle N.	21
Swink, F. Nelson, Jr.	44
Syroechkovskii, E. E.	36
Szarski, K. W.	51
Tanaka, Ryo	31
Tanner, Wilmer W.	79
Tashian, Richard E.	80
Taylor, J. S.	59
Taylor, T. M. C.	6
Tenery, J. M.	79
Thomas, Erhard	80
Thomas, Jack	67
Thompson, Donald R.	48

	Page
Thorsteinsson, R.	8
Tilden, Freeman	9
Tisdale, E. W.	6
Tomanek, G. W.	23
Tozer, E. T.	8
Trainer, Daniel O., Jr.	32
Trautman, Milton B.	81
Tupikova, I. V.	36
Turček, F. J.	59
Tusnádi, G.	59
Tyrone, Victor	39
Udvardy, M. D. F.	52
Uhlig, Hans G.	39
Urban, Emil K.	56
Vannersdall, Harry E.	6
Venables, L. S. V.	51
Venables, U. M.	51
Venters, H. D.	32
Volpe, E. Peter	80
v. St. Paul, Ursula	53
Voris, John Calvin	34
Wagner, Helmuth O.	55
Wagner, Kenneth	19
Waldo, Ednard	10
Wallmo, O. C.	63
Watson, Adam	57,75
Watts, May T.	4
Webb, Robert	24
Weidmann, U.	71
Wells, K. F.	32
Wendt, R. F.	44
West, Jack W.	21
Westerskov, Kaj	63,65
Wetmore, Alexander	57
Whitaker, Lovie M.	55
Wick, Wm. Q.	21,40,71
Wier, John	2
Williams, G. R.	64
Williams, Laidlaw	58
Williamson, Francis S. L.	57
Williamson, M. H.	72
Wilusz, Zdzislaw	36
Wing, Leonard W.	12
Worley, D. P.	27
Wright, A. H.	80
Wright, Anna A.	80
Yocom, Charles	8
Zeedyk, Wm. D.	42
Zimmerman, Dale Allen	25
Zimny, Marilyn L.	39

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